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VOL. 42 MARCH–APRIL 1916 No. 162

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United States Naval Institute Proceedings

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CONTENTS

	PAGE
The Moral Factor in War.—Frost	349
Naval Strategy.—Fiske	387
Some Observations About Discipline.—Price	409
Wanted! A Naval Militia Mission.—Riggs	417
The Cost of Building a Battleship in a Navy Yard.—Gleaves	439
Territorial Waters.—Sparrow	447
Building Programs and Naval Bases.—Davis	461
War Provisions for Guam.—McIntosh	471
Method of Calculating the Intersection Point of St.-Hilaire Position Lines.—Roden	481
Engineering Post-Graduate Schools from the Student Standpoint.—Wilson	493
Superdreadnoughts and Supermen.—Kinkaid	503
The Ships of the United States Navy.—Neeser	509
A Report of John Paul, Master of the Ship "John."—Paullin	523
Industrial Management in Navy Yards.—Yates	525
Tetra-Nitro-Aniline (T. N. A.).—Bradley	533
A Realistic War College.—Morgan	543
Discussion	555
Secretary's Notes	557
Correction	562
Professional Notes	563
European War Notes	629
Naval Publications	679
Annual Financial Report of the Secretary and Treasurer of the United States Naval Institute	687
Notice.—Extract from Constitution	691
Special Notice.—Naval Inst. Prize Essay, 1917	692
Prize Essay Topics	693
List of Prize Essays	694
Advertisements.	

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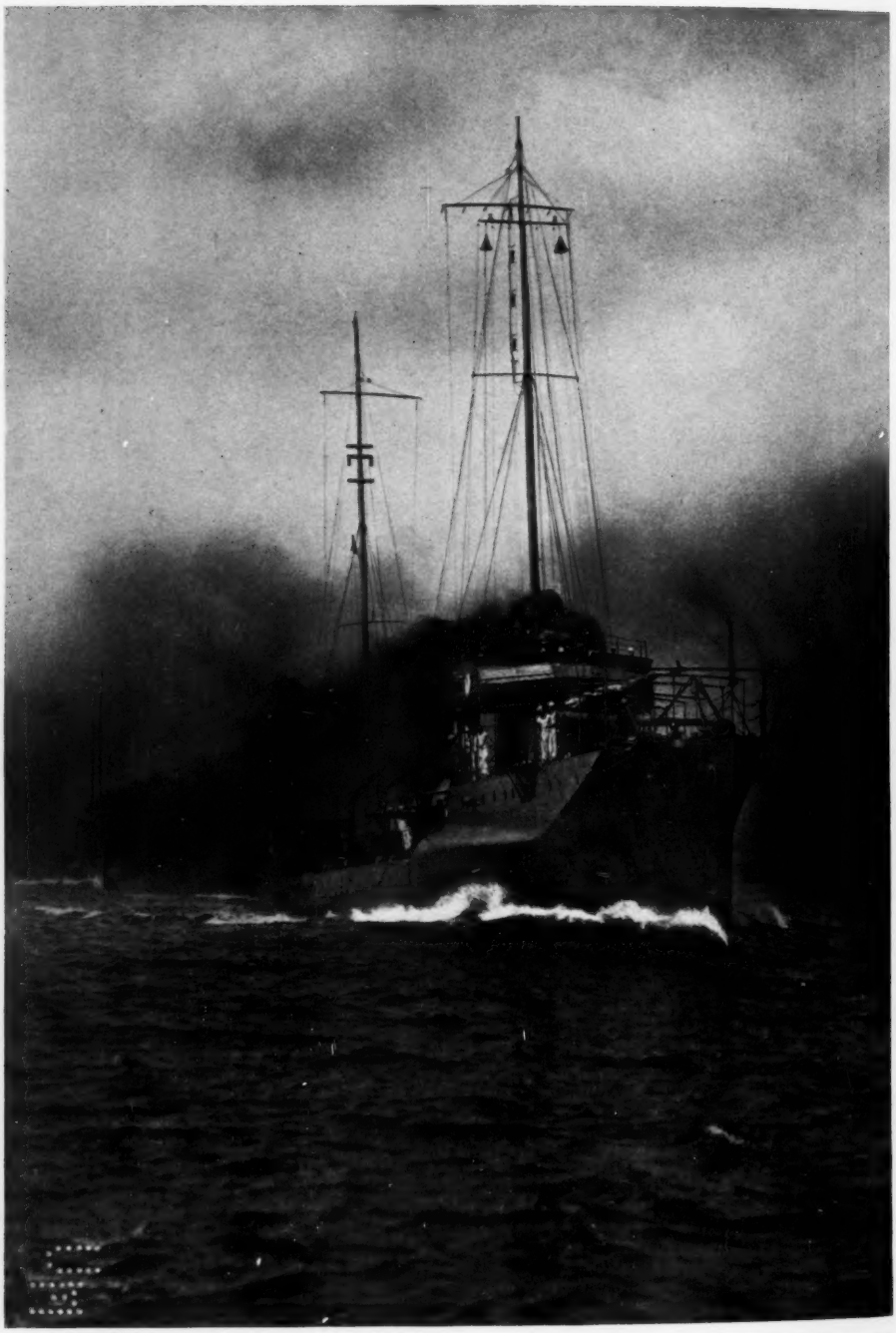

THE "McDOUGAL" AND "CASSIN." OUR LATEST 1000-TON, OIL-BURNING DESTROYERS, WORKING UP A SMOKE-SCREEN FOR ATTACKING PURPOSES

UNITED STATES NAVAL INSTITUTE PROCEEDINGS

Vol. 42, No. 2 MARCH-APRIL, 1916 Whole No. 162

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

Prize Essay, 1916

THE MORAL FACTOR IN WAR

Motto: "In war the moral is to the physical as three to one."—NAPOLEON

By LIEUTENANT (J. G.) H. H. FROST, U. S. Navy

A nation may be considered as composed of three elements: (1) the civil population, (2) the leaders, both political and military, and (3) the armed forces.

There are, in general, two ways in which these elements may be combined so as to form a nation. These two forms of government we will call autocratic and democratic. In an autocratic government the leaders control both the civil population and the armed forces. In a democratic government the people control the leaders, who in turn control the armed forces. In the first the leaders rule; in the second, the people. Actually there are no purely autocratic or democratic governments, but each government is a combination of the two forms, in which one or the other to a certain degree predominates. However, this classification will prove to be useful to us in our discussion.

The ruling element of the nation determines the international policy. The leaders are entrusted with the duty of carrying out this policy. Upon the policy itself and the success with which it is carried out depend the greatness of the nation and its position in the world.

The policy and the success with which it is carried out, and therefore the greatness of the nation, depend upon the power of the

nation. The policy must be proportional to the power. A wise statesman will not aim so high that the national power is insufficient to execute his policy. On the other hand, he will not aim so low that a considerable part of the national power need not be used in the execution of the policy. He will increase the aggressiveness of the policy to that point when nearly all our power will just insure its execution.

While we have seen that the policy must depend on the power, the power itself will also depend to a great extent on the policy, *i. e.*, the ways in which the power is used. Unless our power is used continually in attaining the highest aims, unless the policy ensures a continual struggle toward a higher position in the world, and keeps us in competition with the other nations, it will not be possible for a nation to develop great national power. Thus we see that a strong policy and great power go hand in hand and mutually support each other.

National power depends, first, on the inherent physical, intellectual and moral health of the people, and second, on the methods by which the lines along which this inherent strength of the people is used to develop the national power.

In general, there appear to be two lines along which this strength of the people may be employed for carrying into execution the national policy. The life of a nation may be divided into the periods of peace and war. Therefore it would appear that the strength of the nation may be employed along the two general lines of the pursuits of peace and those of war. Power in the pursuits of peace we will call "commercial power," and power in the pursuits of war, "military power."

In the same way that policy and power interdepend, so do commercial and military power. Commercial power supplies the resources for military power so necessary to-day; military power provides the opportunity for commercial power. Without both commercial power and military power no nation may gain a high position in the world. Commercial and military power afford each other mutual support. Both commercial and military power are important at all times, whether the nation be at peace or at war.

Our policy, if it be worthy of our power, will be opposed by other nations. The statesmen may carry out in peace the nations policy by using the nation's reputation for power, or he may carry out the policy in war by actually using the commercial and military power

of the nation. Both these instruments for carrying out policy, diplomacy and war, have been constantly used in the past. The actual circumstances of the case must determine which of the two may be used with the most effect. It would seem, on the surface, that diplomacy is a more efficient instrument than war. But, while war causes a great wastage in men and material, the war training and experience greatly increases our military power. Also, as a successful war will greatly increase our reputation for power, it will increase the efficiency of our diplomacy, and allow us to use this instrument to great effect after the conclusion of the war. On the other hand, a war, ending in defeat, will greatly decrease our reputation and may result in the downfall of the nation. However, such a defeat will have no worse effect than a cowardly surrender without resistance, and it will often have a good effect in that it results in the nation making a fresh start toward regaining its national power. We must realize that war is an efficient and necessary, though dangerous, instrument of policy, and must do everything to increase our commercial and military power, so that we may carry the war to a successful conclusion.

In war there may be said to be three factors; the physical, the intellectual and the moral.

The physical factor relates to the material from which the armed forces of a nation are formed.

The intellectual factor relates to the plans for perfecting and organizing the physical power and to plans for its use in war.

The moral factor relates to the spirit in which and the courage with which the physical and intellectual powers are used in preparation for and actually in war.

These three factors may be summed up as follows: material, knowledge, and courage.

Although material is important, and knowledge for preparing and using the material, even more so, the courage with which our material and knowledge is used, or in other words, our moral power, is easily the most important of all.

While the physical and intellectual powers have contributed greatly toward victory, it may be laid down that victory has never been gained except as a result of greater moral power, while in many cases in history, it has been gained despite a decided disadvantage in the physical and intellectual powers.

In the end, it is the moral power of the opposing nations that decides a war and the moral powers of the armed forces that decide a campaign or battle. One side yields when it considers resistance no longer possible, or when it considers that further resistance will not justify the sacrifices that further fighting requires. Therefore the supreme object in war is not to kill and wound men or to destroy material, which are only means to the end, but to reduce the moral power of the enemy to such a point that he loses confidence in the ultimate result.

In our discussion of moral power, we will consider in order: (1) the moral power of the civil population, (2) the moral power of leaders, and (3) the moral power of the armed forces. Each of these powers influence the others to a marked degree. The civil population, the leaders and the armed forces must be united by the closest ties for the nation to gain great moral power.

We will first consider the moral power of the people. The moral power of the people is shown by the steadfast resolution to make every sacrifice to ensure the victory of the fatherland. This implies absolute confidence in victory, enthusiastic and united support of the leaders and armed forces and entire submission of personal interest to the welfare of the nation.

The best illustration of the enormous advantage of moral power of peoples is seen in the wars of the French Revolution and Empire. In the first part of these wars, the French people conquered the European kings, and in the second the European peoples conquered the French emperor.

The moral power of a nation depends, first, on the nature of the nation itself under normal condition, and second, on the special conditions of war which affect the moral power.

The inherent moral power of the people depends on:

1. The character of the people.
2. The closeness with which the people are united by race.
3. The form of government.
4. The past history.
5. The ambitions of the people for the future.

The general character of the people has an immense effect on their moral power. There can be no clearer example of the influence of the character of the people on their moral power than that shown by the history of the Roman Republic and Empire.

In the days when Hannibal was at the gates of Rome, after defeating every army sent against him, the moral power of the Roman people was superb. The Roman citizen was not a soldier only because of necessity or duty, but he demanded his station in the legion as his dearest right. Citizens could gain a high political and social position only after gaining a military reputation. The sons of the rich and influential demanded their place in the first line of battle, and the poorer classes had to be content with positions of less danger. When the Roman citizens were of this character, there can be little wonder that their state gained dominion over all the world known to them.

After Rome had gained world supremacy, ease and luxury undermined this superb military character. The rich no longer demanded their place of honor and, in fact, were glad to escape entirely the hardships of a military life. Men joined the legions for high pay and booty; mercenaries were hired to fill out the depleted ranks. German cavalry defended the frontiers. Generals raised their legions not to fight the foreign enemies of the nation but to win, in the civil war, power for themselves. That Rome lasted so long as it did under these conditions was due largely to the great personal power of many of the emperors and to the reputation gained for the Roman name in the healthy years of the republic.

The strong character of the Swedes in the time of Gustavus Adolphus is shown by the saying " The Swedes do not defend their men with walls, but their walls with men." This strong military character demanded success in the face of overwhelming numbers.

It is very difficult to mold the character of a people. While it will take many years to influence the character of a people, it has been done many times in history. The only means by which it may be accomplished is by the education of the youth of the nation. The system of universal military service in European nations has greatly improved the military character of the people.

The strong character of a people, when once gained, may be retained only by a strong national policy, which requires the greatest efforts of the people. The people must be constantly struggling toward the highest aims, so as to allow no time for ease and luxury to undermine their character.

For a people of a nation to exercise the greatest moral power, and to give their united support to the leaders and the armed forces,

they must be united in thought and sentiment, and this united thought can be obtained only when the people of the nation are all closely united by race. The Roman people, when, after many defeats, they repelled Hannibal from their walls, the Dutch in their heroic wars for independence, the French in the revolutionary wars against all Europe and the Spaniards in their war to throw off the Napoleonic yoke all showed a moral power, which would surely not have been possible had the people of these nations not been all of one race.

It is naturally a great disadvantage for the people of a nation to be composed of two or more races. It is natural that there should be a nation for each race, and when we go against the laws of nature in attempting to form a nation out of several races we must expect a certain weakness. Two or more races may be distributed in one nation in two ways: 1st, the people of each race may be concentrated within definite territorial limits, in some cases having their own government. 2d, the people of each race may be dispersed over the entire territory belonging to a nation, and all races mixed so as to form in time a new race.

In history races have been combined in the first way usually as the result of the annexation of territory by force, the intermarriage of reigning houses, or the union of two or more nations against a common foe. The most noted example of this method of combination is the Holy Roman Empire. The weakness of such a combination is shown by the fact that the Emperor never exercised more than a nominal control over the many divisions of the empire. Austria-Hungary is the best example of such a combination to-day. Its weakness in this respect is fortunately counteracted by the common love of all the races for the Emperor, and the common fear of Russia. England by the annexation of Scotland and Ireland suffered a tremendous loss of power by the combination of three races into one nation. For hundreds of years the revolutionary condition of Scotland and Ireland offered an opportunity to every enemy of England.

Races are combined in the second way when a race, abandoning its own territory, conquers and settles in territory occupied by other races, or when several races unite in forming a new nation in territory either uninhabited or occupied by very inferior races. After the Norman conquest of England, the Norman and Anglo-Saxon races were combined in this way. For many years the

jealousy of the races greatly reduced the moral power of the English, but this weakness gradually disappeared as the two races became merged into one. Our own nation is a combination of many races in new territory. While the Normans came in practically one body, the foreign races are constantly arriving in our land. Thus, while the English races were in time completely merged, in our case the new arrivals will be a constant source of weakness.

While the combination of two or more races into one nation will always greatly reduce the moral power of the people, the second method of combination is naturally far more efficient than the first, as by so mixing the races as to form in time a new race, we finally remedy the vicious conditions. Races combined in the first way really do not form one nation but of an alliance of nations under one leader.

For the people to cheerfully support the leaders and the armed forces, the war must be popular with them. Either they must favor the war of their own accord or they must be so obedient to their leaders that they will favor any war entered into by the leaders. In a country having a democratic government any war must be popular with the people. This is a great advantage of this form of government. In an autocratic government the leaders, if wise, will not enter into a war unpopular with the people. Russia engaged in such a war with Japan, and was defeated largely as a result of lack of moral power. Japan, on the other hand, also an autocratic nation, showed the greatest moral power because the war was popular with the Japanese.

An autocratic government has one important advantage denied to the democratic nation, the love of the people for their sovereign. This reverence for their sovereign tends to increase greatly the support given by the people to their leaders. Also the support is usually more united. In an autocratic nation, the people as a rule, think of the welfare of the nation before their private interests and there is not seen so often that colossal selfishness of small communities and politicians, and that deadly party strife, in which the armed forces and the international policy are used for political effect, that is so often seen in democratic governments. While, in peace, a division of power among many persons has advantages, in that each person acts as a check to the others, and so prevents too

radical tendencies, and bases the government on the whole people rather than on a few leaders, in war, unity of purpose is the first essential and divided counsel leads to defeat.

The weaknesses of a democratic nation in war cannot be better illustrated than by the recent war with Spain, in which a large portion of our navy was wasted in useless coast defence.

With reference to a recent bombardment of coast towns, the British Admiralty says:

> The Admiralty takes the opportunity of pointing out that demonstrations against unfortified towns or commercial ports, though not difficult to accomplish provided that a certain amount of risk is accepted, are devoid of military significance.
>
> They may cause some loss of life among the civil population and some damage to private property, which is much to be regretted, but they must not in any circumstances be allowed to modify the general naval policy which is being pursued.

The democracy of the English people, their selfish and independent attitude has practically never allowed their government to live up to this most correct and courageous statement.

What a contrast do we see in the patriotic attitude assumed by the German civil population in 1870? The perfect strategical deployment of the Germans left bare of troops a large part of the frontier, which was thereby open to attack by the French Turcos, who were much feared. The German people, having confidence in their leaders, did not ask that troops be taken from the concentration to be used merely for the defence of the frontier against isolated attacks of no military importance.

It must be admitted that, in war, the autocratic government, under careful leaders, is far superior to the democratic form. In fact the democratic of its own accord becomes autocratic, and liberty loving peoples often concentrate in a few men powers that they would little dream of in time of peace.

The past history of a nation must have a great effect upon the moral power of the people. The brilliant history of the British Navy, with its long and almost unbroken record of victories, must greatly increase the confidence of the English people to-day. The glorious days of the Napoleonic era must inspire the French Army with the resolution to repeat them. The wars of the Great Frederick must spur on to renewed efforts the Germans in their war to-day.

Ambition is as necessary for a successful nation as it is for a successful man. The high aims for the future of Germany, Japan and Italy must to a great extent increase the moral power of these peoples to-day.

We have now completed our discussion of the influence exerted on the moral power of the people by the nature of the nation. We must remember that by increasing the moral power of the people, in addition to increasing the military power of the nation, we increase the commercial power also, and thus by raising the moral tone of the people we increase the efficiency and power of the nation for whatever task it may undertake.

We will here make a brief examination of the nature of our nation and of its inherent moral power.

Our country is peopled by a mixture of all the races of Europe. While this must be a considerable handicap, especially if we should engage in war with a European power, it is considerably lessened by the fact that these races are merged into one race in a short time. The fact that equal rights are granted to all races, rapidly decreases the inherent jealousy of the races and tends to merge them quickly into one race. However, the steady flow of immigrants always gives a certain proportion of the population who retain their racial jealousies, and this must decrease the moral power of our people.

Our government is democratic, and we have already seen the weakness of this form of government in war. However, these weaknesses are to some extent remedied by the fact that the President, when a man of strong character, holds a tremendous power as a political leader in addition to his official powers. In war this condition causes almost supreme power to be concentrated in the President, the form of government changing automatically from the democratic to autocratic.

The character of our people is unfortunately unmilitary to the last degree. Our isolation from other great nations has seemed to prove to many people that military power is unnecessary. Advocates of peace and disarmament have made systematic attempts to discredit military power and war. The first object of the people being riches and a life of ease, they hate to use money for military power, and are unwilling to undergo the hardships of the military life. Along with these go the most insidious and tremendous conceit and the idea, drawn in some most incomprehensible way from our past history, that one American is a match for five or six

people of any other nation or race, and that therefore we can defeat any other nation without any preparation whatever. The unmilitary character of our people, resulting from these causes, has always prevented due preparation of our military power, and will be the greatest weakness in actual war.

In our past history we have much to be proud of. The navy and the regular army [1] have remarkable records of efficiency, which are forgotten by all except a very few, as it has become the fashion to discredit all our military heroes. Conceit and overconfidence are all that most Americans gain from our past history. These traits weaken our power to a remarkable degree.

Our ambition for the future seems to be a world wide peace and disarmament. This would naturally be very advantageous for us, as we are not a military nation, but at present there seems no prospect that this ambition will be realized. By carrying into execution such a policy, we naturally kill the military spirit of our people.

From the above examination we can readily see that the nature of our nation is such that the moral power of our people under ordinary conditions is far less than that required of a great nation. However, our people fortunately, when specially stirred or in a great crisis, rise gallantly to the occasion and show a tremendous increase of moral power. In war, there are many means by which we may stir the people and increase their moral power. The following are some of the most common of these means of increasing the moral power:

1. The use of unlimited rather than limited war.
2. The conviction of the people that they are fighting in a righteous cause and in self-defence.
3. The personal influence of great men.
4. The influence of gallant exploits.
5. The reporting of the operations of the armed forces.

Clausewitz, in his theory of war, found it most useful to divide all wars into two classes, one of which he called "unlimited war," the other "limited war."

A nation engages in an unlimited war when it is so vitally concerned that it puts forth all its powers. In such a war the complete overthrow of the enemy is the object and neither side yields until it considers it impossible to resist further.

[1] After the first year of the Civil War, both armies are considered as "regular."—H. H. F.

A nation engages in a limited war when it is not vitally concerned and employs only a part of its powers. Such a war has not the complete overthrow of the enemy as its object, but rather some less important result, which will be of advantage to the country obtaining it. In such a war neither side resists, as a rule, until it considers further resistance impossible, but rather until it considers a further continuation of the war inadvisable, for the reason that the probable gain does not appear to be worth the sacrifices that further fighting would make necessary.

Thus the class of war in which a country is engaged will affect greatly the intensity with which it will be waged. Limited war is waged by the armed forces of the nation largely without the assistance of the people, while in unlimited war the people as well as the armed forces must do their utmost to bring the war to a successful conclusion. It is readily seen that a nation engaging in a war which is limited as concerns itself, but unlimited as concerns the opponent, is at a tremendous disadvantage, as the armed forces will be without the support of their second line, the people, while the enemy will be strongly backed by his second line. Thus when considering a declaration of war we must consider how vitally our interests are concerned and, as a rule, we must not engage in war unless our interests are so vitally concerned that the war will need and obtain the strong support of the people. The Russo-Japanese War was, as is so well shown by Kuropatkin, not vital to Russian interests, and consequently was decidedly unpopular with the Russian people. On the other hand it was vital to Japan and consequently very popular with the Japanese. These facts largely account for the great difference between the two nations in a moral power and the final result. Fortunately there is little chance that our nation will engage in war unless it is vitally concerned.

It is of the greatest importance for the people of a nation at war to be convinced that they are fighting in a righteous cause. Since war has become so unpopular, it is also important to prove that the enemy is responsible for it and that we are taking up arms because force to in self-defence. Fortunately the people of a nation can be easily convinced of these facts. In many cases, where the " place in the sun " is not large enough for all, nations are drawn into conflict by the laws of nature and each side may be able to consider itself in the right and the other side as being

responsible for the war. In the Roman Civil War Cæsar repeatedly asked for a truce to decide matters without fighting, so as to throw the blame of the war upon Pompey for refusing the truce, and in this way rally to his side all those who wished for an end of the war. This skillful diplomacy had much to do with his success.

Great leaders have always greatly increased the moral power of the people. Political leaders are in a position to exercise a great influence over the people. Lincoln and Gambetta, both purely political leaders, had immense influence over their peoples. Although great military leaders have their greatest influence over the forces under their command, still in many cases they have exerted a marked power on their people. Bonaparte in his first campaign, when he was purely a military leader, Nelson, and Lee, by their strength of character and abilities, have all elevated the moral tone of their peoples, and increased to a marked extent their confidence in victory. Napoleon, when the political and military leader of France, influenced his people probably more than any man in history. The rather studied methods by which Marshal Von Hinterburg and General Joffre have been elevated to the positions of national heroes shows the importance placed by governments on this means of increasing the moral power of the people. In this connection must be noted the disadvantage of basing all the hopes of the people on one man. If Napoleon had fallen on one of his campaigns, there is little doubt that France would have fallen with him, as Swedish power fell with the death of Gustavus Adolphus. The loss of Stonewall Jackson was a tremendous loss to the South in that it greatly reduced the confidence of the Southern people in victory. Had Lee fallen also it seems probable that the Southern cause would have fallen at once.

Gallant exploits, even though of little military value, have a tremendous effect upon the moral power of the people. The remarkable cruise of the *Emden* under her gallant commander, the voyage of her landing force across the Indian Ocean and through Arabia; the exploits of Von Weddigen; the last picture of the *Gneisenau* firing her only remaining gun at long intervals as she sank; the heroic end of the little *Nurnburg* as she went down with the few remaining men of her crew waving their flag on the quarterdeck must have stirred the patriotic ardor of the German people to such an extent that the advantage gained cannot be measured in money, ships or any other physical assets. The official reports are filled with the

gallant exploits of small bodies of men, which must increase the pride of the people in their troops, and strengthen their resolution to support their armed forces. Napoleon well knew the importance of this means for increasing the moral power of the people, and his bulletins were a continual record of the gallant exploits of his soldiers.

The reporting of the results of operations by the armed forces is an art in itself. While generals have exaggerated their victories and lessened their defeats from the beginning of history, Napoleon may be called the founder of the art of systematically preparing reports to increase the confidence of the people in victory. While all of Napoleon's campaigns up to that of 1812 ended in victory, except possibly the Syrian campaign, they were always in doubt up to within a few days of their completion, and there were many checks which had to be covered over by the bulletins. Such was the combat of Durrenstein in the 1805 campaign, Pultusk, Eylau and Heilsberg in that of 1807, and Essling in that of 1809. These means of controlling the public gave excellent results as long as the campaigns ended in success, for then they had a basis of truth. However, a lost campaign could not be covered over, or a definite defeat made into a victory by such slight-of-hand methods.

To-day the official reports of the armed forces are most carefully prepared to increase the moral power of the people. These reports use a general ground work of fact, amplified by numerous details which attempt to place in the most favorable light the operations of their own forces. The military student may discern the ground work, but the general public sees no farther than the details designed to catch their eye. A victory is painted in gaudy colors with the numbers of guns and prisoners taken; a defeat is admitted, but to gain it "the enemy has had to waste men and material," our retirement is made "in perfect order," to "regroup our forces," to abandon a position "no longer of tactical or strategical importance," or "to lure the enemy into a trap." In the minor trench warfare favorable operations are reported, while all others are omitted, except that in important operations it is necessary to admit a loss of territory. The official reports, when carefully written, do much to increase the moral power of the people, but the exaggeration must not be too great and care must be taken that the people are not made overconfident, as overconfidence is nearly as bad as lack of confidence.

While we realize the great importance of doing everything in our power to increase the moral power of the people, we must not overestimate the importance of this moral power, and not allow efforts to increase it to interfere with the campaigns of our armed forces or to weaken our military strategy. Napoleon's march to Moscow, in the Russian campaign, was largely for political and moral effect, and in it Napoleon allowed these influences to weaken his strategy, so that when its moral force was insufficient to make the Russians sue for peace, its military weakness resulted in disaster for the French. We must not expect our moral power to win the war alone, but we should use our moral power continually to produce favorable material results, which will increase still more our moral power and decrease that of the enemy.

Having completed our survey of the moral power of the peoples, we will next discuss the moral power of the leaders. We may briefly define the moral power of a person as "strength of character," or more fully as willingness to take responsibility, courage in planning operations, determination in executing the plans decided upon without vacillation and despite difficulties and setbacks, and firmness in defeat and disaster.

As we examine the characters of the great leaders of history we see that each possessed intellectual power and moral power to the highest degree. It is evident that one could not reach the first rank as a leader did he not possess both of these powers. As we examine the characters of the lesser leaders we see that their abilities have depended upon the degree of intellectual and moral power they have possessed. While history shows the importance of both these powers, it clearly shows that moral power is more important and more necessary for a leader than intellectual power. The tremendous responsibility which rests upon the shoulders of high political and military leaders in war insures the absolute failure of any leader who lacks the greatest moral power. On the other hand, many leaders, who have possessed great moral power, have succeeded in war, even though they have possessed but average intellectual power. It is therefore evident that we should do everything in our power to insure that our leaders have the greatest moral power, as this is necessary for their success in war.

The moral power or strength of character of a person depends, to a considerable extent, upon the inherent strength of character

with which he is born. It also depends upon the manner in which his character is developed and trained during his youth.

In order for a person to be able to display his natural moral power in any certain profession, he must be confident that he can solve and carry through all the special problems of his profession which may be presented to him. To obtain this confidence he must understand the various methods by which the various problems of his profession may be solved, and the relative value of these methods for each particular problem, in other words he must know the theory and practice of his profession. However, this knowledge alone will hardly give him the necessary confidence in himself. He must actually solve and carry through these problems, applying his knowledge without outside assistance.

Bonaparte, before the Italian campaign, had most thoroughly educated himself in both the theory and practice of war, and therefore, when he received the command of the army of Italy, was confident of success. However, even with his tremendous inherent strength of character, strengthened by the most careful and thorough study of the art of war, he could hardly have had, upon first taking command of an army, the supreme self-confidence which made him one of the boldest men who ever led an army. He needed practical experience in actually directing an army in the field to remove his last doubts as to his ability as a leader. His first brilliant campaign against Colli and Beaulieu, terminating in the "terrible passage of the bridge of Lodi," afforded him his necessary proof. The most extraordinary action at Lodi had a most tremendous effect upon his character. He said at St. Helena: "Vendemiaire and Montenotte had not warranted me in considering myself an exceptional man. Only after Lodi did the idea come to me that thenceforth I should become a decisive player on the political boards. Then arose the first sparks of high ambition."

Therefore we see that the moral power a person may display in a profession depends upon:

1st. His inherent strength of character at the time he commences his preparation for his profession.

2d. His knowledge of the theory and practice of his profession.

3d. His actual experience in his profession.

In selecting candidates for the military profession we should select those persons who have the maximum inherent moral power

at the time their preparation for the profession is to commence. To increase the efficiency of this selection, these candidates should be given a period of service on probation during which period their character should be accurately estimated.

To induce those selected to gain the greatest knowledge of the theory and practice of their profession they should be given the greatest incentives. Deserving officers should be afforded every opportunity of realizing their personal ambitions in the service. We should constantly appeal to their patriotism by showing them that the country is in need of their greatest efforts, and that the life of the nation may depend upon the zeal with which they prepare themselves for war. The fatherland should appreciate fully their efforts and should place the members of the military services in positions of the highest honor.

As we have seen above, mere knowledge of his profession alone cannot give an officer the necessary moral power. It is necessary that he have actual experience in applying his knowledge to special problems, for whose solution he is personally responsible. In order that willingness take responsibility, courage in planning operations and determination in their execution may be encouraged, superior officers should afford subordinates every opportunity for using their professional knowledge with their own initiative. To this end, in assigning a task, the general method to be used in its accomplishment only should be given by superior authority, the details of the plan and its execution being left entirely to the subordinate. In as many cases as possible, the task alone should be assigned and the methods to be used left entirely to the decision of the subordinate. Errors in the selection of plans and mistakes in their execution should be pointed out by superior authority, but the initiative of subordinates should not be killed by severe punishment, unless their errors result from their bad spirit or their neglect.

In time of peace every effort should be made to train the commissioned personnel, and to increase their knowledge and experience. In actual war it is too late to begin to train the personnel, but the experience gained by leaders in war will greatly increase their moral power as the war progresses and for future wars. This completes our discussion of the personal moral power of leaders and the methods of training by which this moral power may be increased.

A leader's personal moral power in war is naturally greatly affected by the actual conditions under which he is working. It is not enough to train in time of peace leaders of great power and strength of character. We must afford these leaders the most favorable conditions in war, so that they will be able to make full use of their powers. We will therefore examine in turn the various factors which influence the moral power of leaders in war, and the various methods which have been used to increase this power.

The physical health of a leader has often decreased the resolution and firmness with which he is directing the movements of his forces. The indecision, delay and confusion in the execution of the beautifully planned campaign of 1815 have been attributed correctly to the ill health of the Emperor. Many generals after a lost campaign have been retired from their commands for sickness. However, in most cases in history, sickness has failed to weaken the moral power of great leaders. Wolfe and Nelson fought continually against sickness. Charles XII of Sweden was carried in a litter at Pultowa, as was the old Spanish general Fuentes at Rocroi. Massena, rather than give over the command of his corps at Wagram, rode into the thick of the action in a carriage and displayed the greatest determination in most critical situations. Blücher rose from a sick-bed to come to the assistance of Wellington at Waterloo.

A leader's strength of character is usually greatly influenced by the success or failure of the recent operations. In the campaign of 1870, after Bazaine's huge army had been shut up in Metz, the German supreme command left an army of equal size to invest it, while it directed the third and Meuse armies against MacMahon's reserve army and, after that had been destroyed, into the very heart of France. This advance with a fortress and a large field army directly on the lines of communications has always been considered as a dangerous and risky operation, and it was so considered at the time by eminent authorities. The supreme command would hardly have ordered this movement, which resulted in such complete success, had it not been greatly encouraged by the repeated and easy victories of the previous two weeks. In the campaign of 1806, the Prussian defeat and the death of Prince Louis, at Saalfeld, broke the resolution of the Prussian leaders and for a time created anarchy at the royal headquarters. How-

ever, there have been many leaders who have been greater in defeat and disaster than in victory. Thus Massena, after his army had been defeated and cut in two, made a most remarkable defence in Genoa. At the battle of Marengo, when he was told that the French army had been defeated, Desaix said: "The battle is lost, but we have time to win another." This he proceeded to do. Blücher's frequent defeats could not in the slightest degree weaken his resolution, and Marshal Soult showed the greatest firmness during his long retreat from Spain in 1813-1814 under the most discouraging conditions.

The relations between the leader and his superior have a great influence upon his moral power. In our discussion above of the methods of training leaders, we touched upon the subject of the orders given a leader by his superior. We will now discuss this most important question more fully and examine the affect that various kinds of orders have upon the resolution of the subordinate.

First, we may see that it will be of advantage if the leader receives orders from but one superior, to whom he is responsible for their execution. At one time in the campaign of 1870 Marshal MacMahon, commander of the army of Chalons, had three distinct superiors; Bazaine, who was shut up in Metz 75 miles away, the Regency at Paris, which attempted to claim for itself the powers which belonged by right to the Emperor, and finally the Emperor himself, who was actually with the army. With such a conflict of authority, it is not at all surprising that his operations were marked with such fatal delay and indecision.

Second, we will agree that orders from superior authority should clearly define the task to be accomplished, so that there will be no doubt left in the mind of the subordinate. In the battles around Metz, in 1870, Bazaine commanded the French Army of the Rhine. Napoleon III, while actually with the army, did not exercise the supreme command on account of ill health, but required Bazaine to submit his plans to him for approval before starting to execute them. In this position of a critical spectator, the Emperor, always an astute politician, would be able to take the credit for the successes, and throw on Bazaine the blame for the failures. It is evident that Bazaine could not act with determination under these vicious conditions.

Third, it is evident that orders should not be changed or countermanded unless it is absolutely necessary that they should be. In the campaign of 1859 Gyulai, the Austrian commander-in-chief, issued several complete sets of orders to his army, in great length and detail, within a space of six hours, without hearing any news of the enemy. Many corps reoccupied at sunset, after a long, forced march, the very position they had left at daybreak. This work to no purpose, very naturally discouraged the subordinate leaders and induced them to criticise their superior. It is generally considered advisable for a leader to carry through with firmness one plan, rather than to change it frequently for something which he considers a little better.

Fourth, as it is bad to countermand orders, we see that only those orders which are absolutely necessary for the immediate future should be given to the subordinates. This implies that no orders should be given out which cover a long period in the future, because movements of the enemy and other unforeseen developments will almost always make it necessary to change or cancel these orders before the time for their execution arrives. In the campaign of 1870 the German supreme command, in ordering the advance of the third and Meuse armies to advance on MacMahon, covered a period of three days in one order. It justified this later by saying that it assumed no contact with the enemy during this period. However, the French Reserve Army of Chalons proved to be much better prepared than the Germans supposed, and it actually commenced operations on the same day that the German armies did. This mistake in estimation forced the supreme command to countermand the original orders on the third day, causing a certain amount of confusion.

Fifth, it is thought bad for the superior officer to issue an order to his subordinate, detailing a number of situations which may occur in the course of an operation, with an order as to what is to be done in each case. These detailed instructions confuse the subordinate, especially if a situation arises which does not fit into the order, either being not covered in the order at all, or a combination of two or more of the given situations. When such orders have actually been given in campaigns, it is surprising to see in how few cases the actual situation corresponded with one of those given in the order. Confusion as to his task and the methods ordered by superior authority to accomplish it, reduce the resolution with

which the subordinate leader will carry out his operations, in addition to producing many material results of great importance.

Sixth, as a general rule orders should indicate the task, and the general method to be used in accomplishing it, and should leave the details to the subordinate leaders. For a leader to have moral power he must be allowed to act as far as possible on his own initiative. The granting of initiative allows the subordinate to gain strength by actually using his authority to plan and carry through operations, proportional, of course, in importance to his rank, and it shows him that his superior has confidence in him, thus increasing his own confidence. The German supreme command has always considered it advisable to grant initiative to the subordinate leaders, believing that the few errors made by the subordinates in acting upon their own initiative, are more than counterbalanced by the increased moral power gained by the subordinates and the many material advantages which have always been gained through the use of this system. In 1859 Gyulai habitually issued orders to his army which covered many printed pages. These often provided for the movements of individual regiments of infantry and squadrons of cavalry. He might just as well have dispensed altogether with his division and corps commanders, if he were to tie them down to such details and make all their own decisions for them.

In some cases even the general method of operation should be left to the initiative of the subordinate leaders, especially when the superior is at a distance from the field of action. Thus Bonaparte, when First Consul, drew up a plan of campaign for Moreau in 1800. The latter disapproved this plan, and proposed one not nearly as good. Napoleon had the good sense to allow Moreau to use his own plan, which ended with success in the battle of Hohenlinden. Napoleon, in later years, failed to live up to his own standard and attempted to direct from Paris the campaign in Spain. The efficiency of this method of directing armies may be seen from the fact that one of his orders to Massena was received three months after it was issued in Paris. In 1870 MacMahon was placed under the orders of Bazaine, who was 75 miles away and shut up in a fortress. Bazaine at first very correctly told MacMahon to act on his own initiative, but later ordered him to advance upon Metz. Such orders were hardly likely to be carried out with determination by MacMahon, especially as he knew that

Bazaine could have little information as to the true situation. The good results of the granting of proper initiative to subordinates are well illustrated by the boldness with which the German leaders in 1870 took advantage of every opportunity. The official account shows that the great victories of Metz and Sedan was due largely to the initiative exercised by the army and corps commanders. This in no way decreases the credit due to the supreme command. The great results gained by Nelson were likewise due to the intelligent initiative of the English captains. This is especially illustrated by the brilliant maneuver of Captain Foley, of the *Goliath*, at the Battle of the Nile, in passing inside the French line, which made possible the concentration on the head of the French line. This move was made entirely upon the initiative of the captain and reflected great honor both on him and the commander-in-chief.

A subordinate naturally does not wish to act without orders from superior authority. If he knew that he could act in all cases in accordance with the wishes of his commander, even though he received no direct order at the time, it would be more probable that he would act with the necessary speed and resolution on his own initiative. Therefore the supreme command usually prepares and issues to the subordinate leaders a general doctrine of action. Also, it informs the subordinates from time to time of the general plan. Therefore, by acting in accordance with the doctrine and in such a way as to further the general plan, the subordinate may feel that he is loyally obeying the wishes of his superior, even though his action at the time is made without orders and on his own initiative. Nelson's Memorandum before Trafalgar may be considered as both a doctrine and a general plan. Nelson was always careful to fully explain to his captains all his ideas on tactics, and this greatly increased the initiative of his subordinates. Napoleon often complained that the marshals did not understand his "system." This system was what we would call to-day a "doctrine," but Napoleon, instead of teaching this system to his generals, did his best to keep it secret, as he feared that if his opponents learned it, they would be able to oppose him so much more successfully. This secrecy naturally killed the initiative of his marshals. However, in this case the Emperor's reason for secrecy was a most powerful one, because he could never count on the loyalty of the marshals. Bernadotte and Murat deserted him, Moreau went into the service of Russia and Jomini, Ney's

chief of staff, who knew Napoleon's system better than any other, went on the staff of the Czar, where his knowledge was of the greatest importance. The issuing of a general plan also informs the subordinate leader what assistance he may receive from the superior authority in carrying out an operation to further the general plan. The German supreme command, in 1870, was very careful to inform all the army commanders of its general plan. We may be sure that, if it had not been for the knowledge of the general plan and the certainty that they would be sustained if they commenced an operation to further it, two army corps and two cavalry divisions would not have attacked the whole French Army at Vionville and Mars-la-tour, which action resulted in the entire capture of the army.

Leaders should be rewarded by their superiors for efficient service. Nelson was always ready to praise his captains and to reward them for efficient service. Napoleon gave his successful generals every honor. His bulletins were filled with the brave deeds of his officers.

Superiors should always supply their subordinates with every possible facility for carrying out their task, and should support them loyally in every way during its execution.

The moral power of a leader is greatly affected by the attitude assumed by those officers with whom they must cooperate, and by the ability of these officers. The loss of Spain by Napoleon in 1810-1814 may be charged to the jealousy of the French marshals and the total lack of cooperation between them. As an example of the effect of these vicious conditions, we will examine briefly the relations between Massena and Bessieres at the time of the battle of Fuentes D'Onoro in 1811.

Massena, who was one of the best and strongest of the marshals and who had made a remarkably successful record in the great wars of the French Revolution and Empire, both as a subordinate leader and as a commander-in-chief, had made a long winter campaign in Portugal. He was forced to retreat into Spain, more on account of lack of provisions than of actual defeat by the English, and halted in the province of Salamanca. This province was governed by Marshal Bessieres, who had under his orders the fine regiments of the guard, and was himself directly under the orders of the Emperor of Paris. Massena at once sent an aide

to Bessieres, requesting his assistance. Bessieres at once promised to send several regiments and batteries with abundant food and material. After a month and a half this assistance arrived and was found to be but 1500 cavalry and six guns, without material and food. Bessieres appeared in person with this force, which he retained strictly under his command, so that he might make Massena consult him, and so that he might criticise the latter's operations. The battle of Fuentes D'Onoro was opened by a brilliant move on the part of Massena, the French cavalry breaking up the English right wing. This cavalry getting temporarily out of hand, due to the death of the commanding generals, Massena requested General Lepic to charge with the cavalry of the guard, so as to complete the victory. This general declared that he could not charge without orders from Bessieres. The latter, who had thus far always been continually at headquarters offering his advice and criticisms, could not be found. When finally discovered at a remote part of the battlefield, he declared that he would not allow the guard to be engaged, because, if it should suffer any losses, he would be responsible to the Emperor for them. Massena, not daunted by this lack of cooperation, which was not far from treason, commenced a new attack with infantry and artillery and was making excellent progress, when he received word that the ammunition was running low. Massena then asked if he could borrow the caissons of the guard to send to the rear for more ammunition, but Bessieres, claiming that these had made a long march, refused the use of them until the next day. By this time the English had so strengthened their position, that a further attack was out of the question. Apart from the actual material results of this jealousy, we must note that the moral power of Massena was so broken that he was never able to make another campaign. The loss of one of his most capable assistants certainly contributed to Napoleon's fall.

The leader's knowledge that we will be loyally sustained by his companions, will naturally give him confidence to engage in dangerous but profitable operations, which will further the general plan of their common superior. Nelson would hardly have moved single-handed into the middle of the Spanish fleet at St. Vincent, had he not been certain that he would receive prompt assistance from the other captains and the commander-in-chief. The Eng-

lish captains under Nelson always acted with the greatest boldness and determination, because they were assured of swift and certain assistance. The German corps and division commanders in 1870 always knew that their comrades would march to the sound of their guns.

We have seen above the value of a doctrine and a general plan in the relations between a leader and his superior. The doctrine and the general plan also tend to increase the efficiency of the cooperation between leaders as they offer them a common aim and common methods to attain this aim. In thus furthering the cooperation between leaders they tend to increase their moral power.

We will next examine the effect of the actions and attitude of subordinates upon the leader. In order that a leader may act with confidence and determination, he must be certain that his subordinates will loyally obey his orders. The leader who has a strong personal character may act with indecision when he is not certain of the loyalty of his lieutenants. There have been few generals who have a stronger character than Marshal Massena. His absolute refusal to attack the Russians at Zurich in 1799 until he obtained favorable conditions, even when he had been repeatedly ordered by the Directory at Paris to attack, and his decisive victory when he finally decided to attack, stamped him as a general of the greatest moral courage. His obstinate defence of Genoa in 1800, when the civil population were in a state of insurrection and his army was starving, required the greatest determination. Still we see this general in Spain in 1811 acting with the greatest indecision, when many opportunities were granted him for a decisive victory. If we examine this campaign we see that this was caused by the fact that his lieutenants, Ney, Junot, Reynier and Montbrun constantly refused to obey orders. Under these conditions we could hardly expect his campaign to end in anything but failure. Kuropatkin was greatly handicapped by the inability and disloyalty of the corps commanders. One of his leading generals returned to Russia without even notifying the commander-in-chief. In 1806 the Prussian Colonel Massenbach reported that an order of the supreme command could not be executed, because he hoped that by doing this, he could convince the supreme command that his own plan of operation was better than

that being then executed. He believed that the Prussian Army could not be saved unless his plan was used. If all subordinates acted in this way, the supreme command would have little chance of accomplishing anything.

Now let us examine the effect in history of the high and loyal spirit of subordinates. At Castiglione, in 1796, Bonaparte had almost decided to retreat. Augereau, then a general of division, then declared that he would remain and fight, even if all others retreated. This decided Bonaparte to accept battle. On the next day a great victory decided the campaign in his favor. Similarly at Marengo Desaix saved the day when all was considered lost. Nelson was always assisted by the great loyalty of his captains. The German supreme command in 1870 and the Japanese in 1904 always relied upon the loyalty of their lieutenants.

The quality of the force under his command has a considerable effect upon a leader's moral force. We may be sure that during the French Revolution and Empire there were many bold and skillful officers in the French Navy. The continued defeats which the French Navy experienced in this period may be laid primarily to the weakening effect exerted upon the resolution of the admirals and commanding officers by the general inefficiency of the entire naval forces. This most certainly broke Villeneuve's spirit so that he gave over a most excellent opportunity to carry out the Emperor's brilliant plan. The inefficiency of the Russian second category troops in Manchuria did much to kill the spirit of their leaders. The condition of Cevera's squadron convinced him at the beginning of the campaign that success was impossible. MacMahon's Army of Chalone, in 1870, being composed partly of troops that had already been defeated and partly of raw militia, some of which had to be sent back to Paris on account of their bad conduct, could inspire him with but little confidence in ultimate victory. On the other hand Napoleon, in 1806, advanced directly upon Berlin, being confident that with the magnificent army under his command he could defeat the Prussian Army wherever and whenever it might appear.

The moral power and the attitude of the civilian population of the nation influences the moral power of the leader. We may easily see the effect upon MacMahon's character caused by the order issued by the Regency at Paris, in deference to the shouts of a Paris mob, mistaken for public opinion, to advance upon Metz.

Knowing that he was being sacrificed to appease the public opinion, MacMahon advanced with hesitation, hoping that his protests or some unforeseen accident would result in a change of plan, while there was still a chance to save his army by a rapid retreat.

On the other hand the enthusiasm of the civil population may inspire the leaders with the greatest confidence. We may imagine the effect upon Lincoln made by the stirring reply to his demand for volunteers, the great war song, "We are Coming, Father Abraham, Four Hundred Thousand Strong."

Information of the enemy has a most important bearing upon the leader's boldness. Thus McClellan in the Peninsula Campaign thought the Confederate Army defending Richmond twice as strong as it actually was and made a weak retreat when a stout attack all along the line would probably have resulted in a decisive victory. Naturally cautious and lacking the resolution necessary for the commander-in-chief of an army, the false information given him by the Pinkerton detectives, used as spies, broke completely his moral power. In the campaign of 1859 neither of the opposing commanders, Gyulai and Napoleon III, had any reliable information of the other's forces. Each thought the other was about to take the offensive against him, and so both remained stationary for several weeks, strengthening their positions and preparing for a hostile attack. In Nelson's search for the French fleet, which ended in the Battle of the Nile, he was almost entirely without information of the enemy, due principally to his lack of scouts. The tremendous mental strain of this campaign would have broken the courage of the average commander, and the great resolution of Nelson in this search should have won for him higher honor than the great tactical victory with which it was ended.

Information of the character of the opposing leader is also a great assistance to a leader. In our Civil War many of the leaders on both sides had known each other intimately at West Point or Annapolis. This allowed them an insight into the character of their opponents which they were quick to take advantage of.

Lack of information of the enemy, in addition to weakening the resolution of the leader, may have the bad effect of making him overconfident. Thus, at the Battle of Sedan the French leaders

thought that they were opposed by the German Meuse Army only. Had they known that the third army also was present, they would have retreated with greater speed and would have avoided, to some extent, the complete defeat that they actually received.

Thus far we have considered the effect upon the leader of those factors which concern our own country and our own forces, which factors we may control. We must now briefly consider those factors which concern the opposing forces and which we may control only indirectly.

The ability and moral power of the opposing leader, of the opposing armed forces and of the opposing civil population all influence the moral power of a leader. Generals and admirals have always displayed their greatest resolution and made the most brilliant campaigns of their career against inferior leaders and inferior armies. Against leaders superior in power they have never acted with their usual courage and ability. Labienus was one of Cæsar's greatest lieutenants and made under him in Gaul several really brilliant campaigns. Later when he opposed his former commander his campaigns were far below his standard. Cæsar's moral power was so great that his opponents were practically beaten before the campaign began. Pompey had made several fine campaigns and had earned the title of "Magnus," but he made practically no resistance, so completely was he overawed by Cæsar's very name. He would attempt nothing and would stand passively upon the defensive. Archduke Charles was an excellent general, but opposed to Napoleon dared to make no offensive movement. Just imagine the feelings of a general opposed to the great Napoleon! We should not be surprised to see the extreme caution with which the Allies acted against him, even in 1814, when they knew that he had but a handful of men. Imagine the effect of Nelson's name upon the French!

The composition of the opposing forces also had its effect. Imagine the state of mind of the barbarian leader upon seeing the Roman legions deploying for the attack. Who would like to be in the place of the leader against whose divisions the imperial guard was advancing, with their "*Vive L'Empereur,*" sounding above the roar of the battle? How did the French leaders, Chanzy and Bourbaki, feel when they drew up their *guardes mobile* against the veterans of Metz and Sedan?

Having now completed our discussion of the various factors in war which affect the moral power of leaders, we may enumerate them in review as follows:

1. The personal health of the leader.
2. The recent events.
3. His relations with his superiors.
4. His relations with those officers with whom he must cooperate.
5. His relations with his subordinates.
6. The ability and spirit of the force under his command.
7. The attitude of the civil population of the nation toward the military services.
8. The force and ability of the opposing leader and force.

By moral power we mean confidence, but not overconfidence. This overconfidence may be caused by an exaggeration of one's own powers, underestimation of the opposing forces and leaders, and the failure to see clearly the actual facts of the situation. Overconfidence usually results in the undertaking of operations that are beyond our powers and manifestly impracticable. We should keep in our minds the example given us by Charles XII and Napoleon. The overconfidence of these bold and able leaders resulted in the ruin of their countries.

We will next discuss the moral power of the armed forces. By the moral power of leaders we meant their power to lead bodies of men in their own initiative. By the moral power of the armed forces we mean the spirit of a body of men, the spirit in which they follow and obey their leaders. This moral power is shown by the most perfect discipline and obedience at all times, persistent courage and determination in action, willingness to undergo privation and hardship, constancy in defeat and disaster, and the most perfect confidence in ultimate success.

It requires no argument to prove the great importance of this moral power; it has been recognized from the first days of history. We find in Cæsar's Commentaries: "There is a certain impetuosity of spirit and alacrity implanted by nature in the hearts of all men, which is inflamed by a desire to meet the foe. This a general should endeavor not to repress, but to increase; nor was it a vain institution of our ancestors that the trumpets should sound on all sides, and a general shout be raised, by which they imagined that the enemy was struck with terror and their own army was inspired

with courage." Notwithstanding the statement of one of our inventors that war is to-day entirely a matter of physics and chemistry, the moral power is just as important as it was in the days of the Romans. Listen to what Bernhardi says: "But within certain limits, which are laid down by the law of numbers, the true elements of superiority under the present system of gigantic armies are seen to be spiritual and moral strength, and larger masses will be beaten by a small, well-led and self-devoting army." Sir John French, in an official statement, said that the principal reason for the attack at Neuve Chapelle was the desire to increase the moral power of his forces.

We will now examine in turn the various factors which affect the moral power of the armed forces.

The moral power of a body of men is naturally affected most of all by the ability of their own leaders. All leaders influence their men for good or bad to a most remarkable degree. Let us see how they may use this influence to increase the moral power of the organization which they command. War is a hard game. Those who enter it for pleasure will see that they must undergo the most extreme privations and hardships, even if they were not killed or wounded. Therefore there must be some inducements offered to those who engage in it. They must be fighting for some definite aim. While this aim may in some cases be impressed upon the men of the armed forces by the civil population, by their political leaders, or may fully realize its importance for themselves, it is always the duty of the military leader to impress it upon his men with the greatest emphasis, appealing to their reason, and to their sentiments and feelings. The aim or aims for which the armed forces fight depend, of course, upon the actual situation and upon their racial characteristics.

Let us examine briefly the various aims for which great armies have fought, so that we may select that one which will inspire most our men in various situations which may occur in the future.

The Athenians at Marathon fought for their very existence as a nation. The ten thousand, in their retreat from the heart of Persia, fought for their personal safety. Alexander's conquering army fought for their king and for their personal glory and profit. The Romans, in the Second Punic War, displayed a most remarkable devotion, after two of their armies had been totally destroyed and Hannibal had actually reached the walls of Rome, in defence

of their nation and their homes. Likewise Hannibal's army showed the greatest constancy in the seventeen years they remained in Italy practically shut off from their home. These fine soldiers were fighting for their beloved leader, and for their own glory and profit. Cæsar's fine legions fought for their great leader and for the high pay they received and the booty they could gain. Cromwell's army fought for political freedom and for their religion. The remarkable army of Gustavus Adolphus was actuated by love of their king, by desire to make the position of their country more secure and to assist those in Germany who were of their own religion. The French Republican Armies were carried away by the freedom they had tasted, and fought to bring their liberty to the other peoples of Europe. Napoleon's soldiers were animated by the most perfect devotion to their Emperor, their love of glory for themselves and for France, and by the desire for the riches which Napoleon showered upon them. In our Civil War the North fought to preserve the Union, and the South to gain what they considered their liberty, motives which induced both to make the greatest sacrifices. The German Army, in 1870, considered that they were fighting for the security of their fatherland.

We see that there are many aims for which great armies have fought. We see them fighting to defend their country and their very homes, to render their country secure against attack, to increase their country's power and reputation, to assist those of their own religion, to gain for themselves and others political freedom, to increase the personal power of their leaders, to win for themselves honor and fame and to gain riches and booty. Which one of these aims will most increase the moral power of the armed forces depends upon the nature of the armed forces themselves and upon the conditions under which they are operating. But some definite aim or aims, whatever they may be, unless they are already present, should be impressed upon the men of the armed forces by their leaders.

Let us consider the means by which great leaders have impressed an aim upon their men. John Sobieski, King of Poland, addressed his troops before the great battle with the Turks under the walls of Vienna: "To-day you fight not for Poland, but for Christianity; not for your king but for your God." Nelson, before Trafalgar, sent the famous signal: "England expects every man to

do his duty." Togo, at the battle of the Sea of Japan, signalled to his fleet: "The fate of the empire depends on this battle; let every man do his utmost." Both of these signals nerved the fleets to fight with the greatest of resolution. In the above actions the commanders were sure of the devotion of their forces and used only brief messages to remind their forces of the critical situation.

However, all leaders have not had such patriotic and devoted forces under their command. Thus Cæsar had to use all his powers to increase the morale of his legions, which frequently mutinied and broke in panic in action. Napoleon had even more uncertain troops with which to deal. As Napoleon was able to inspire his troops with moral power to a most remarkable degree, we will examine his methods in some detail.

The French Revolution had dissolved completely the regular army and navy. The new army was composed of new levies and national guards, who had no idea whatever of discipline or obedience, especially as they usually elected their own officers. These troops were poorly clothed and lacked food and equipment, all of which still further weakened whatever discipline they had. While these troops were greatly improved by constant warfare, they never acquired a proper discipline. In the early years of the revolution they had been inspired by the hatred of the kings and the idea that they were bringing liberty to the peoples of Europe. This wonderful spirit wrought wonders. "Such a Gallic fire blazes in this people, like a conflagration of grass and dry jungle; which no mortal can withstand for the moment." (Carlyle.)

However, this idea in time died out and the French successes ended. A new aim was necessary. This Bonaparte supplied. In his first proclamation to the army of Italy it is set forth: "I will lead you into the most fertile plains in the world. There you will find honor, fame and riches." The Emperor, in later years, used constantly this formula "honor, fame and riches," which had proved to be so successful. He offered rewards in every form to the soldiers. Every private in the ranks, had he the necessary ability, had the opportunity to rise to the highest ranks, general, marshal of France, and even sovereign. If he had not the ability to be an officer, but still served with courage in the ranks, he received first a sword or rifle of honor, and later the coveted cross of the Legion of Honor. Gallant deeds of regiments and individual soldiers were mentioned in the proclamations to the army and

in the bulletins to France. Regiments were given special names of honor and were personally thanked by the Emperor when their work was specially well done. The elite of the army was formed into the imperial guard, in which all regiments were commanded by general officers, and in which each officer was advanced one grade over those holding similar positions in the line. The pay of the soldiers was greatly increased, and the marshals and generals amassed great fortunes as a reward for their good services. The Emperor, in his proclamations and in his addresses to the troops, constantly exhorted them to make renewed efforts so as to win the peace they so greatly desired, and emphasized the honor with which they would be treated by their fellow citizens after their return from the great campaigns in which they were taking part.

While he thus rewarded the efficient and obedient of the army, he punished the inefficient and the disobedient with a heavy hand. Generals were instantly retired from their commands whenever they showed weakness, lack of industry or bad spirit. No reward was given to anybody who was absent from the colors.

In addition the Emperor used every means in his power with the greatest skill to win the love of the soldiers, and with such success that his soldiers were fanatics in their worship of him. If we add to all this his wonderful reputation as a general, his great record of victories, and the great boldness and resolution with which he directed his campaigns, we may readily see how he changed an indisciplined army into one which is almost without parallel in all history.

In addition to giving his men an aim to work for, so as to make certain that all will work with the greatest industry, the leader should inspire his men with the confidence that the campaign actually being undertaken will end in success. The men of the armed forces realize that war is a serious undertaking, so they naturally wish an able leader, one who will obtain the desired result with the least losses. In order to make the soldiers confident in their leader, the latter must convince the soldiers of his ability. He may do this by mere personal magnetism, by his actual ability in directing his force, or by a combination of these two methods.

General McClellan was a man of the greatest personal magnetism. He obtained a most remarkable influence over his army, even after bad defeats in which he displayed neither moral courage nor ability. Napoleon III attempted to raise the morale of his

armies by imitating the methods of his uncle, and by using the effect of his name to revive the Napoleonic legend. He obtained some success in this line although he had very little ability as a general.

Many other generals and leaders were content to let their deeds speak for themselves, making no effort to become popular or to use their personal influence in gaining the confidence of their forces. Massena was never loved by his soldiers, but all recognized his ability and wished to serve under him. Wellington neither liked his army, of which he was constantly complaining, nor was he liked by his men, but he was always greatly respected by them as an able leader. The French Marshal St. Cyr was hated by his men, but they still recognized the fact that he was almost a perfect tactician and were glad to serve under him.

Practically all the greatest leaders have been men of the greatest personal magnetism. They have always used this magnetism, not as did McClellan and Napoleon III, but supported by the actual fact of their great deeds and ability, to increase to the greatest possible extent the confidence of their men in victory. Napoleon, Cæsar and Alexander inspired their men by their wonderful magnetism. The " Nelson touch," animated the whole English Navy with a wonderful spirit. John Paul Jones, by his wonderful spirit and determination in action, drew forth surprising efforts from one of the poorest crews that a captain had. Ney, Lannes and Murat could lead their troops anywhere by their inspiring example.

It is said that Napoleon's presence upon the battlefield, and the effect it had upon the morale of his troops was worth 30,000 men, while Nelson was himself equal in value to a reinforcement of three ships of the line.

Leaders have used various methods to increase the moral power of their men before battle. Cæsar always addressed the troops; Cromwell started the custom among his ironsides of singing hymns on the charge; Gustavus had prayers said; the Republican Armies of France went into action singing the " Marseillaise." Napoleon issued his proclamations and addressed his troops; " Remember, soldiers, that it is my custom to bivouac on the field of battle." Before Austerlitz he pointed out the false movements of the enemy and proved to the soldiers that an easy victory awaited them.

He was always careful to enumerate to the soldiers all the occasions on which they had beaten the present enemy in past campaigns.

We will now consider the ways in which the leader's manner of directing the force under his command affect the moral power of the men. The men soon learn the character and ability of their leader. The leader gains the confidence of his men by acting with decision and resolution; he loses it by delay and vacillation. One plan, even if it is not the very best possible, is far better than constant changes of plan and counter orders, resulting from changes in the leader's views.

All leaders have recognized the important moral advantage which is inherent in all offensive operations, and therefore all great captains have always used this form of operation, except in cases where they have been greatly outnumbered, in a very unfavorable situation, or when for other reasons of special importance it has been thought advisable to act upon the defensive.

The result of the first action in a campaign has a great effect upon the morale of the armed forces, and therefore all generals have made great efforts to win it. The action at Valmy in 1792 has been classed as a decisive battle, although it was no more than a distant cannonade. It was decisive because it increased the morale of the raw French troops, who had on every previous occasion fled in a panic after the first shot was fired. Many military writers have wondered why Napoleon held his cavalry back with the infantry corps in 1806, instead of sending them to the front for information, as was his custom. A possible reason for this was that the Prussian cavalry was noted for its efficiency, and that Napoleon feared that, if he opposed his cavalry to them, the enemy would gain the moral effect of winning the first engagement. The Japanese first encountered European troops at the Battle of Yalu in 1904. They realized the great importance of an initial victory over the Russians. This would explain the great caution with which they acted, and their failure to make a sharp pursuit, which would have completed their victory.

The supply of food has an important effect upon the moral power of troops. The Austrian Marshal Radetzky said: "A good soldier must have a full stomach. See therefore that your men have sufficient food. A hungry soldier has no courage." While there may have been exceptions to this rule, in the main it holds

good. Lack of food did more than the Russians to break down the Grand Army in 1812.

The supply of clothing and equipment is also a factor. The soldier who receives a pair of shoes with paper soles or discovers that sand is used as the bursting charge for his shells, will hardly be encouraged by these facts to fight courageously.

Weapons superior to the enemy's encourage the armed forces, because they realize that they are of great material value in action, and because these weapons prove to the men that the government has made every effort to provide them with the necessary material and has developed a superiority in supplying arms and munitions. It is therefore the duty of the leader to see that his men have sufficient food, the best possible clothing and equipment, and the greatest quantity of the most efficient weapons and ammunition. In this way, in addition to increasing the material value of the force under his command, he also increases its moral power.

The actions of political leaders have an influence upon the moral power of the military services. The example of men high in public life who use the army and navy to gain for themselves political capital, who attempt to establish navy-yards and army posts in certain parts of the country for the sole reason of bringing commercial opportunities to the citizens of these communities, and in this way securing their re-election to office, and who force the government to accept poor material for the financial benefit of their friends, can hardly increase the moral power of the armed forces. On the other hand they may greatly increase this power. It was the fiery eloquence of Danton which nerved the indisciplined French mob, not worthy of the name "army," to withstand the Prussian invasion and beat it back at Valmy in 1702. Lincoln, with his wonderful personal magnetism, was to a great degree responsible for the magnificent moral power shown by the federal armies toward the close of the Civil War. His wonderful speech at Gettysburg inspired the whole North. Gambetta stirred all France to make every effort to repel the German invasion, and gathered great armies which, allowing for their inexperience, fought with great courage and determination.

The civil population, by their loyal support and praise of deserving military services, may exert a great influence. The Romans, in the days of the Republic, the Germans, in 1870, and the Ameri-

cans on both sides in the Civil War, so inspired their armies with firm resolution and determination, that it was not necessary for the leaders to employ a regular system for raising the moral power of their forces. On the other hand harsh and unreasoning criticism of the personnel of the armed forces by citizens, especially those employed in the interests of various "peace leagues and associations," has a most injurious effect. In 1905 the Russian civil population undermined the moral power of their troops, deluging them with seditious pamphlets, inciting them to disobey the commands of their officers. Kuropatkin notes this as one of the principal causes for the failure of the Russian Army in this war.

In battle the smallest incident may break the moral power of an army or fleet. The best soldiers are liable to break in panic for the smallest reason. The great battle of Munda, in the Roman Civil War, was decided for Cæsar by a mere accident. After fighting for hours on even terms, a small body of Cæsar's cavalry passed around Pompey's right flank and attacked his camp. A few cohorts were sent to beat this cavalry off. The movement of these cohorts to the rear was taken by both armies as the beginning of a general retreat. Cæsar's men were encouraged, while Pompey's were discouraged. Another final charge by Cæsar resulted in the complete rout of the enemy, whose moral power had been completely broken. In the Battle of Arcole, in 1796, the Austrians, after fighting with the greatest constancy for three days, were routed by a mere trick. A small body of cavalry, 25 men with four trumpeters, rode around their flank and simulated the arrival of a large force of cavalry upon the Austrian rear. The whole line retreated, leaving the field and the victory to the French. At Polotsk, in 1812, a charge of one squadron of the Russian guard upon soldiers dispersed and looting the Russian camp threw a large part of the French Army into a panic and very nearly resulted in the capture of their commanding general.

This completes our discussion of the moral power of the armed forces. The necessity for increasing the moral power of the armed forces must be realized by the whole nation. Having seen the various methods used for this purpose by great leaders and great nations, we must select for our own use those methods best suited to the character of our forces and to the conditions under which they are operating.

In order to obtain the greatest results from the moral power of the civil population, the leaders and the armed forces, that is to obtain the greatest moral power for the whole nation, these three classes must be bound together by the closest ties. Each must loyally support and assist in every way the others, and each must work for the welfare of the whole nation. If the supreme leader is an hereditary sovereign, the civil population and the armed forces will be bound to him by the closest of ties, the reverence and obedience of the people for their sovereign, built up through the past centuries. Universal service in the armed forces binds together the civil population and the armed forces and makes them practically one.

In our country we have neither of these two great agencies through which the nations moral power is increased. It is difficult for a republic to obtain the necessary unity of thought and action. If we are to play a part in world history that will be worthy of our ancestors, worthy of Washington and Lincoln, of Farragut and Grant, we must be united, compact and act as one man; we must build up the nation's moral power. This can be accomplished only by the utmost patriotism of all our citizens. Each citizen before he enters upon any undertaking, no matter how small or unimportant, should ask himself: "Will this promote the welfare of the whole country?" Only then will our country play a great and worthy part upon the world stage.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

NAVAL STRATEGY

By REAR ADMIRAL BRADLEY A. FISKE, U. S. Navy

Strategy is difficult of definition; but though many definitions have been made, and though they do not agree together very well, yet all agree that strategy is concerned with the preparation of military forces for war and for operating them in war—while tactics is the immediate instrument for handling them in battle. Strategy thinks out a situation beforehand, and decides what preparations as to material, personnel, and operations should be made.

Many books have been written on strategy, meaning strategy as applied to armies, but very few books have been written on naval strategy. The obvious reasons are that armies in the past have been much larger and more important than navies; that naval men have only recently had the appliances on board ship for writing on an extensive scale; and that the nature of their occupation has been such that continuous application of the kind needed for thinking out principles and expounding them in books, has only recently been possible.

Most of the few existing books on naval strategy deal with it historically, by describing and explaining the naval campaigns of the past and such land campaigns as illustrate principles that apply to sea and land alike. Perhaps the best books are those of Darrieus and Mahan.

Until about 50 years ago, it was only by experience in actual war, supplemented by laborious study of the campaigns of the great commanders, and the reading of books on strategy which pointed out and expounded the principles involved in them, that one could arrive at any clear idea of strategy.

But wars have fortunately been so infrequent, the information about them has often been so conflicting, and so many results have

been due to chance, that, in default of experience, the mere reading of books did not lead to very satisfactory results, except in the case of geniuses; and therefore war problems and war games were devised, in which the various factors, material and personnel, were represented, and made as true to life as possible.

The *tactical* games resulting, which naval strategists now play, employ models of the various craft used in war, such as battleships, submarines, etc., and are governed by rules that regulate the movements of those craft on a sort of big chess-board, several feet square, that represents an area of water several miles square. The *strategic* games and problems are based on principles similar to those on which the tactical games are based in the sense that actual operations are carried on in miniature; but naturally, the strategical operations cover several hundred miles, and sometimes thousands. The aim of both the tactical and the strategic games is to determine as closely as possible the laws that decide victory or defeat; and therefore, for any country, the material, personnel and operations it should employ. Naturally the results obtained are not quite so convincing as those of actual war or battle; but they are more convincing than can be attained in any other way, as yet devised, especially as many of the operations of the game board that turn out well in games are tried out afterwards by the fleet in peace maneuvers. War games and problems may be compared to the drawings that an architect makes of a house which someone wants to build; the plans and drawings are not so realistic as a real house, but they are better than anything else; and, like the war games, they can be altered and realtered until the best result seems to have been attained, considering the amount of money allowed, and other practical conditions.

The idea of devising war games and war problems seems to have originated with von Moltke; certainly the fact of doing it was by his direction. Shortly after he became chief of the general staff of the Prussian army in 1857, he set to work to carry out the ideas that he had had in mind for several years, while occupying minor posts, but which he had not had the power to enforce. It seems to have become clear to his mind that, if a chess player acquired skill, not only by playing actual games and by studying actual games played by masters, but also by working out hypothetical chess problems, it ought to be possible to devise a system whereby army officers could supplement their necessarily meager experience

of actual war, and their necessarily limited opportunities for studying with full knowledge the actual campaigns of great strategists, by working out hypothetical tactical and strategic problems. Von Moltke succeeded in devising such a system and in putting it into successful operation. Hypothetical problems were prepared, in which enemy forces were confronted with each other under given circumstances of weather, terrain, and distances, each force with its objective known only to itself: for instance, you are in command of such and such a force at such and such a place; you have received orders to accomplish such and such a purpose; you receive information that the enemy, comprising such and such troops, was at a certain time at a certain place, and marching in a certain direction. What do you do?

Classes of army officers were formed, and compelled to work out the problems exactly as boys at school were compelled to work out problems in arithmetic. The skill of individual officers in solving the problems was noted and recorded; and the problems themselves, as time went on and experience was gained, were made more and more to conform to probable situations in future wars with Austria, France, and other countries, actual maps being used, and the exact nature and magnitude of every factor in each problem being precisely stated.

By such work, the pupils (officers) acquired the same kind of skill in solving strategic and tactical problems that a boy acquires in solving problems in arithmetic—a skill in handling the instruments employed. Now the skill acquired in solving any kind of problem, like the skill developed in any art such as baseball, fencing or piano playing, does not give a man skill merely in doing a thing identically like a thing he has done before: such a skill would be useless, for the reason that identical conditions almost never recur, and identical problems are never presented. Similar conditions often recur, however, and similar problems are often presented; and familiarity with any class of conditions or problems imparts skill in meeting any condition or any problem that comes within that class. If, for instance, a man memorizes the sums made by adding together any two of the digits, he is equipped to master any problem of addition; and if he will practice at adding numbers together, he will gradually acquire a certain ability of mind whereby he can add together a long row of figures placed in a sequence he never saw before, and having a sum he never

attained before. Or a pianist, having acquired the mastery of the technique of the keyboard and the ability to read music, can sit down before a piano he never sat at before, and play off instantly a piece of music he never saw before.

Doubtless Moltke had ideas of this kind in mind when his plans for educating strategists and tacticians by problems on paper and by games were ridiculed by the unimaginative, and resisted by the indolent; and certainly no man was ever proved right more gloriously than Moltke. In the war with Austria in 1866, the Prussian army crushed the Austrian at Sadowa in 19 days after the declaration of war. In the war with France in 1870, the Prussian army routed the French and received the surrender of Napoleon III in seven weeks and two days, not because of superior courage or experience in war, but by more scientific strategy. As Henderson says: "Even the French generals of divisions and brigades had had more actual experience (in war) than those who led the German Army Corps. Compared with the German rank and file, a great part of their non-commissioned officers and men were veterans, and veterans who had seen much service. Their chief officers were practically familiar with the methods of moving, supplying and maneuvering large masses of troops; their marshals were valiant and successful soldiers. And yet the history of modern warfare records no defeats so swift and complete as those of Koniggratz and Sedan. The great host of Austria was shattered in seven weeks; the French Imperial Army was destroyed in seven weeks and three days; and to all intents and purposes the resistance they had offered was not much more effective than that of a respectable militia. But both the Austrian and the French armies were organized and trained under the old system. Courage, experience and professional pride they possessed in abundance. Man for man, in all virile qualities, neither officers nor men were inferior to their foes. But one thing their generals lacked, and that was education for war. Strategy was almost a sealed book to them." Also "Moltke committed no mistake. Long before war had been declared every possible precaution had been made. And these included much more than arrangements for rapid mobilization, the assembly of superior numbers completely organized, and the establishment of magazines. The enemy's numbers, armaments, readiness and efficiency had been submitted to a most searching examination. Every possible movement that might be

made, however unlikely, had been foreseen; every possible danger that might arise, however remote, discussed and guarded against"; also, "That the Prussian system should be imitated, and her army deprived of its monopoly of high efficiency, was naturally inevitable. Every European state has to-day its college, its intelligence department, its schools of instruction and its course of field maneuvers and field firing."

Strategy may be divided into two parts, war strategy and preparation strategy; and of these two, preparation strategy is by far the more important.

War strategy deals with the laying out of plans of campaign after war has begun, and the handling of forces until they come into contact with the enemy, when tactics takes those forces in its charge. It deals with actual situations, arranges for the provisioning, fueling and moving of actual forces, contests the field against an actual enemy, the size and power of which are fairly well known—and the intentions of which are sometimes known and sometimes not. The work of the strategist in war is arduous, pressing, definite and exciting; and results are apt to follow decisions quickly. He plays the greatest and oldest game the world has ever known, with the most elaborate instruments, and for the largest stakes. In most wars, the antagonists have been so nearly equal in point of personnel and material that the result has seemed to be decided by the relative degrees of skill of the strategists on both sides. This has been the verdict of history; and victorious commanders in all times and in all lands have achieved rarer glories, and been crowned with higher honors, than any other men.

Preparation strategy deals with the laying out of plans for supposititious wars and the handling of supposititious forces against supposititious enemies; and arranges for the construction, equipment, mobilization, provisioning, fueling and moving of supposititious fleets and armies. War strategy is vivid, stimulating and resultful; preparation strategy is dull, plodding, and—for the strategist himself—apparently resultless. Yet war strategy is merely the child of preparation strategy. The weapons that war strategy uses, preparation strategy put into its hands. The fundamental plans, the strength and composition of the forces, the training of officers and men, the collection of the necessary material of all kinds, the arrangements for supplies and munitions of all

sorts—the very principles on which war strategy conducts its operations—are the fruit of the tedious work of preparation strategy. Alexander reaps the benefit of the obscure labors of his father, Philip; William is made German Emperor by the toils of Moltke.

The work of laying out a supposititious campaign, involving supposititious operations against a supposititious enemy, requires of the strategist a thorough estimate of the situation, including a careful estimate of the forces of the enemy, material and personnel, and of the strategy that will probably govern his operations—whether he will act on the defensive, or assume the offensive; if he is to act on the defensive, how and where will he base his forces, how far will he operate away from his own shores? And if he is to act on the offensive, what direction will his operations take; will he secure an advance base; and if so, where? And as the character of the enemy's operations will depend on the personnel of the enemy general staff and of the high commanders afloat, who comprise the personnel, and what are their characteristics?

To decide these questions correctly requires considerable acquaintance with the enemy country, its navy and its policy, a full knowledge of the strategy, personnel and material of that navy, and a sound conception of strategy itself. But to decide the questions correctly is essential, because the decision will form the basis of the future plans.

Naturally, as the plan is entirely supposititious and is to take effect at some indefinite time in the future, all the factors that will be in existence at that time cannot be foretold exactly, and therefore must be estimated. This will necessitate several alternate hypotheses; and a war plan including mobilization and operations must be made out, based on each hypothesis. For instance, on the hypothesis that the enemy will take the offensive, one set of plans will have to be prepared on the basis that we shall also take the offensive, and another on the basis that circumstances may be such at that time as to make it wise for us to resort to the defensive; while on the hypothesis that the enemy is to remain on the defensive, a set of plans very different from the other two as to both mobilization and operations must be devised.

Each set of the plans just suggested may also have to be divided into two or more parts. On the basis that the enemy will remain on the defensive, for instance, the circumstances when the hour for action comes, such as the fact of his being quite unprepared,

may indicate the advisability of an attack on him as sudden as it can be made; while, on the other hand, circumstances such as the fact of his being thoroughly prepared may render it necessary for us to send a larger force than we could get ready quickly, especially if the enemy coast be far away, and may therefore indicate the advisability of deliberate movements, and even a protracted delay before starting.

But no matter what plan is to be followed, a detailed plan for every probable contingency must be prepared; and it must be elaborated in such detail that it can be put into operation instantly, when the fateful instant comes; because the enemy will put his plans into operation at the same time we do, and the one whose plans are executed first will take a long step towards victory.

Not only must the plans provide some means whereby the plans themselves shall get into full operation instantly when war breaks; other plans must also provide that all the acts which those plans contemplate must be performed. Not only must the plans provide that all the prearranged orders for putting the *Kearsarge* into full commission shall be instantly sent by mail, telegraph and telephone to the proper officials, but other plans must also provide means whereby the officers and men shall actually march on board the *Kearsarge,* her ensign and commission pennant be displayed, all the fuel, ammunition, provisions and equipment be on board; and the *Kearsarge* sail at once, and join the commander-in-chief at sea.

Doubtless the most complicated and comprehensive plans are those for sending a large expedition on an offensive mission to a far distant coast; especially if that coast be guarded by an efficient navy, if it have outlying islands that would afford good bases for her destroyers and submarines, and if there are not good harbors which our fleet could seize as advance bases, from which to prosecute its future operations. The complexity of the task of planning such an expedition, taking due account, but not exaggerated account, of all the factors, favorable and adverse, is appalling; but the task must be undertaken and accomplished. The most tedious part is the logistics—the arrangements for supplying the fleet on the way and in the distant theater of operations with the necessary provisions, equipment and ammunition and, above all, the fuel. The average superdreadnought consumes about 460 tons of coal per day at full speed, and about 108 tons at 10 knots; and coal or other fuel for all the dreadnoughts, battle cruisers,

cruisers of various classes, scouts, destroyers, submarines, ships, aircraft of different kinds, hospital ships, ammunition ships, transports, and the fuel ships themselves, must be provided by means that *must not fail.*

While the work of planning an offensive movement to a distant coast is the most tedious and complex, the work of planning a defensive measure against a sudden attack on the coast needs the most concentration of effort; for whatever the plans require to be done must be done at once. This necessitates that the orders to be issued must be as few as possible, that they be as concise and clear as possible, that the things to be done be as few and as simple as possible, and that all possible foresight be exercised to prevent any confusion or misunderstanding, or any necessity on the part of any one for requesting more instructions.

When the fateful instant comes, the final command to mobilize puts into execution whichever of the plans already made is to be followed; and for this reason it is clear that the various plans must be kept separate from each other, and each set of plans must include all the various orders that must be signed for carrying it into effect, including the particular word or phrase that directs the execution of that particular set of plans.

It is the story that the final order to the British Navy in the early part of August, 1914, was the word "Go." All the units went immediately, understandingly, unitedly; and the greatest machine the world has ever known was almost instantly in operation at full speed. No such stupendous feat, physically considered, had ever been done before. The mobilization of the Prussian Army in 1870 and of the German Army about August 1, 1914, were as great performances mentally and strategically, but not physically, by reason of the relative feebleness of the forces set in motion. This relative feebleness was due, of course, to the insignificance of muskets compared to navy guns, of railway trains compared to battleships, etc.—an insignificance far from being neutralized by the greater number of the units, for one 14-inch shell has an energy equal to that about 60,000 muskets, and no army contains anything approximating the powerfulness of a battleship.

Not only, however, must the strategist make plans in peace for preparations that culminate in mobilization, and simply ensure that the navy shall be ready in material and personnel when war breaks; he must also make plans for operating the navy strategic-

ally afterwards, along each of the various lines of direction that the war may take. In other words, the work of preparation strategy in making war plans may be divided into two parts—mobilization and operation.

The plans of mobilization deal naturally with all the activities concerned, material and personnel, and endeavor to arrange a passing from a state of peace to a state of war in the quickest possible time, and with the least chance of errors and omissions. A considerable degree of imagination is required, an almost infinite patience, and a perfect willingness to work indefinitely without any reasonable expectation of getting tangible results. A more hopeless task can hardly be given any man or body of men than that of working out plans, general and detailed, day after day, for contingencies that will probably never happen, and to guard against dangers that will probably never come; preparing tables, diagrams and schedules, which are almost certainly doomed to rest forever in the sepulchre of the confidential files.

Yet this work is basic. Perhaps it is for that reason that it is obscure and dull; basic work is apt to be so. The spectacular success of an individual in any walk of life is often but the crowning of the unrecognized, and often utterly unknown work—of other men.

Strategy is not a science only; it is an art as well; and although the art cannot be practiced in its perfection until after the science is well comprehended, yet the art of strategy was born before the science was. This is true of all those departments of man's activity that are divided into sciences and arts, such as music, surgery, government, navigation, gunnery, painting, sculpture, and the rest; because the fundamental facts—say of music—cannot even attract attention until some music has been produced by the art of some musician, crude though that art may be; and the art cannot advance very far until scientific methods have been applied, and the principles that govern the production of good music have been found. The unskilled navigators of the distant past pushed their frail craft only short distances from the land, guided by art and not by science; for no science of navigation then existed. But the knowledge gradually gained, passing first from adept to pupil by word of mouth, and afterwards recorded on the written and then the printed page, resulted first in the realization of the fact that

various apparently unrelated phenomena were based on the same underlying principles; and resulted later in the perception, and still later the definite expression, of those underlying principles. Using these principles, the navigator expanded the limits of his art. Soon we see Columbus, superbly bold, crossing the unknown ocean; and Magellan piercing the southern tip of the American continent by the straits that now bear his name.

But of all the arts and sciences, the art and science that are the oldest and the most important; that have caused the greatest expenditure of labor, blood and money; that have been the immediate instruments of more changes and greater changes in the history of the world than any other, are the art and the science of strategy.

Until the time of Moltke the art of strategy, like most arts, was more in evidence than the science. In fact, science of any kind is a comparatively recent product, due largely to the more exact operations of the mind brought about by the birth of the science of measurement, and the ensuing birth and development of the mechanic arts. Before Moltke's time campaigns were won by wise preparation and skilful execution, as they are now; but the strategical skill was acquired by a general or admiral almost wholly by his own exertions in war, and by studying the campaigns of the great commanders, and reflecting upon them with an intensity that so embedded their lessons in his subjective mind that they became a part of him, and actions in conformity with those lessons became afterwards almost automatic. Alexander and Napoleon are perhaps the best illustrations of this passionate grasping of military principles; for though both had been educated from childhood in military matters, the science of strategy was almost non-existent in concrete form, and both men were far too young to have been able to devote much time or labor to it. But each was a genius of the highest type, and reached decisions at once immediate and wise, not by inspiration, but by mental efforts of a pertinacity and concentratedness impossible to ordinary men.

It was because von Moltke realized this, realized the folly of depending on ability to get geniuses on demand, and realized further the value of ascertaining the principles of strategy, and then expressing them so clearly that ordinary men could grasp and use them, that he conceived and carried into execution his plan; whereby not only actual battles could be analyzed, and the causes of

victory and defeat in each battle laid bare to students, but also hypothetical wars and battles could be fought by means of problems given.

The first result of a course of study of such wars and battles, and practice with such problems, was a skill in decision a little like that developed in any competitive game, say tennis, whist, chess, poker, boxing, and the like—whereby any action of your adversary brings an instantaneous and almost automatic reply from you, that you could not have made so skilfully and quickly before you had practiced at the game; and yet the exact move of your adversary, under the same conditions, you had never seen before. Of course, this skill was a development, not of the science, but of the art, as mere skill always is; but as skill developed, the best methods for obtaining skill were noted; and the principles governing the attainment of success gradually unveiled themselves, and were formulated into a science.

Naturally, strategy is not an exact science like mathematics, physics or engineering—at least not now. Whether it ever will be cannot be foretold. The reason that strategy (like medicine and most other sciences concerning human beings) is not an exact science is simply because it involves too many unknown quantities —quantities of which our knowledge is too vague to permit of our applying exact methods to them, in the way in which we apply exact methods to the comparatively well-known quantities and elements in the so-called "exact sciences." But a science may be a science even if it is not an exact science; we may know certain important principles sufficiently well to use them scientifically, even if we do not know them with sufficient exactness to permit us to use them as confidently as we should like. We may know, for instance, that it is folly to divide a military force in the presence of an active enemy into such small forces, and at such distances apart, as to let the enemy defeat each small force, one after the other, even if we do not know exactly how far it would be safe to separate two forces of a given size, in the presence of an enemy of a given power. It is well to know a fact in general terms, even if we do not know it in precise terms: it is well to know in general terms that we must not take prussic acid, even if we do not know exactly how much is needed to kill.

So the studies and problems instituted by von Moltke, and copied in all the armies and navies of the world, have brought

about a science of strategy which is real, even though not exact, and which dwells in the mind of each trained strategist, as the high tribunal to which all his questions are referred and by whose decisions he is guided; just as the principles of medicine are the guide alike of the humblest and the most illustrious practitioner, wherever the beneficent art of medicine is practiced.

It is clear that, in order to be skilful in strategy (in fact, in any intellectual art), not only must a man have its scientific principles firmly imprinted on his mind, but he must make its practice so thoroughly familiar to his mental muscles that he can use strategy as a *trained* soldier uses his musket—automatically. Inasmuch as any man requires years of study and practice—say, of chess—in order to play chess well enough to compete successfully with professional chess players, it seems to follow that any man must require years of study and practice of the more complicated game of strategy, in order to play strategy well enough to compete successfully with professional strategists. The game of chess looks easy to a beginner; in fact, the kind of game that he thinks chess to be is easy. But after he has learned the moves, he finds the intricacies of the game developing more rapidly than he can master them, and discovers that chess is a game which some men spend their lifetimes studying. The full realization of this fact, however, does not come to him until after defeats by better players have forced into his consciousness the almost infinite number of combinations possible, the difficulty of deciding on the correct move at any juncture, and the consequences that follow after wrong moves.

So with strategy. The ease and certainty with which orders can be transmitted and received, the precision with which large forces can be quickly dispatched from place to place, and the tremendous power exertable by those forces, tend to blind the mind to the fact that transferring any force to any place is merely making a "move," and that the other player can make moves too. If a man were never to be pitted in strategy against another player, either in games or in actual war, the "infinite variety" of strategy would never be disclosed to his intelligence; and after learning how to make the moves, he might feel willing to tackle anyone. Illustrations of this tendency by people of great self-confidence are numerous in history, and have not been missing even in the present war, though none have been reported in this country as occurring on the Teuton side. There has always been a tendency

on the part of a ruling class to seize opportunities for military glory, and the ambition has often been disproportioned to the accompanying ability and knowledge—sometimes on the part of a king, prince or man of high nobility, sometimes on the part of a minister, sometimes on the part of an army or navy man, who has been indebted to political or social influence for his place. But within the past 50 years, especially since the establishment of the general staff in Prussia and the studies of von Moltke, the overshadowing importance of strategy has been understood, the necessity of comprehending its principles and practicing its technique has been appreciated, and attempts to practice strategy by persons inexpert in strategy have been deprecated.

The game of strategy, while resembling in many ways the game of chess, differs from it, of course, in the obvious element of personal danger. It also differs from it in an equally important but less obvious way—its relation to the instruments employed; for in chess those instruments ("pieces") are of a number and character fixed by the rules of the game; whereas in strategy the number and character of the instruments (ships, etc.) employed are determined by strategy itself, assisted by engineering. Germany realizes this, and therefore has established and followed a system whereby the character of the various material and personnel units of the navy, and even the number of them (under the restrictions of the money allotted), are decided by a body of men who are highly trained in strategy and engineering.

There is an intimate connection between policy and strategy, and therefore between naval policy and naval strategy; and while it is difficult to draw the line exactly which separates policy and strategy, it may be said in general that policy is the concern of the government, and strategy is the concern of the navy and army, to be employed by them to carry out the policy.

As naval policy and naval strategy are so intimately connected in their essence, it is apparent that the naval policy of a country and its naval strategy should be intimately connected in fact; for the policy cannot be properly carried out if the strategy that tries to execute it is not good, or if the policy requires more naval force or skill than the navy can bring to bear; and the strategy cannot be good if it is called upon to execute a policy impossible to execute, or if the exact end in view of the policy is not distinctly

known. Some of the greatest mistakes that have been made by governments have been made because of a lack of coordination between the government and its navy, so that the policy and the strategy could not work together. We see an illustration of this throughout the history of France, whose civil and naval authorities have not worked harmoniously together, whose naval strategy has apparently been opportunistic and short-sighted, and whose navy in consequence has not been so successful as the large sums of money spent upon it might lead one to expect.

Across the English Channel we see a totally different state of things. In Great Britain the development of the navy has been going on for more than 1200 years, ever since King Offa declared that "he would be secure at home must be supreme at sea." For about 800 years thereafter the development was carried on energetically, but in an opportunistic fashion, following the requirements of the hour. In 1632, however, the Board of Admiralty was established; and with occasional interruptions, especially prior to 1708, the board has continued in existence ever since. A coherent policy of development has thereby been assured, and a wisdom of strategy established which more than any other single factor has made Great Britain the mistress of the seas, and almost the mistress of the world.

The wisdom of her strategy has been due largely to the fact of the close touch maintained between the civil government, including Parliament, and the navy; for by its very constitution the Board of Admiralty includes some of the highest officers of Parliament, the Cabinet and the navy. Its presiding officer is a member of the Cabinet and also member of Parliament; four of the officers are naval officers, high in rank, character and attainments; and the Junior Civil Lord is a civilian versed in naval matters. All the orders for great movements of the fleets and ships are directed by this board and signed by its secretary, the board, by a fiction of the law, being considered an individual replacing the Lord High Admiral—which it did, in 1632. The board is supposed to meet every day with all the members present, the vote of each member carrying as much weight as that of any other member. Naturally, the First Lord of the Admiralty being a Cabinet officer and a member of Parliament, has a far greater influence on broad questions than any other one member; and the First Sea Lord being the person of the most experience in naval matters, has the most

weight on strictly naval questions. Theoretically, however, neither of these gentlemen can carry a measure opposed to the others; and any member, even a junior, has equal opportunity with the others to bring up and discuss any question and to attempt to get its passage by the full board; but in 1869 the First Lord at that time, Mr. Childers, brought about a change whereby the First Lord was made personally responsible to the government. This vastly increased the power of the First Lord, relatively to the others.

Two other navies, the German and the Japanese, which with the British, are the most efficient navies in the world, have systems somewhat different from the British. In Germany and Japan the Emperor is the head of the navy, and there is no civilian between him and it. In Germany there is no Minister of Marine, unless the Emperor himself may be said to be the Minister, which he practically is; and the navy is divided in three parts, each under an admiral. The three parts are the general staff, which deals with war plans and fundamental questions; the naval cabinet, which deals with matters of personnel; and the administrative section, which has to do with questions of material, including money, and the getting of money from Parliament. In Japan the Minister of Marine is by law a naval officer, and under him is a Chief of Staff, also a naval officer. The Minister of Marine has the direction of the navy as a whole, but the ideas of the Chief of Staff are supposed to be carried out in matters that are strictly naval. The Japanese naval officer has a higher regard for the office of Chief of Staff than for that of Minister of Marine, because it is given for professional excellence only.

It might seem at first sight that in Germany and Japan there would be danger of a lack of coordination between the civil and the naval authorities, and a tendency for the navy to become unduly self-assertive. Of course, one reason why there is no such danger is that the governments of those countries are controlled by men who, though civilians, have great knowledge of international affairs, and of military and naval subjects; another reason is that the navy is so vital a matter, accurate knowledge about it is so general, and interest in it so widespread and intense, that there is no great gulf fixed between naval people and civilians. Still another reason is the fact that in each country the Emperor is trained in military and naval duties as well as in civil duties, and

therefore can effect in his own person the coordination of the civil and the naval authority: that is, of policy and strategy.

Such automatic and complete coordination is desirable not only in preventing the unnatural barrier between the civil and the military authority which exists in some countries such as ours, but in lightening the labors and enlightening the deliberations of the strategists. If, for instance, a bold policy is to be enforced, and a large sum of money allotted for material and personnel, the strategists will be led to recommendations different from those to which they would be led if a cautious policy were to be pursued, and a small sum of money to be allotted.

Germany did not turn her eyes seriously towards the navy until the Emperor William II. read Mahan's book, "The Influence of Sea Power upon History." Previous to that epochal event, Germany had relied on her army to protect her interests and enforce her rights, being led thereto by the facts of her history and the shortness of her coast line. But the strategically trained mind of William grasped at once the situation laid bare by Mahan; and his military training led him to quick decision and prompt action. The necessary machinery was soon set in motion, with the amazing result that in 20 years the German navy became the second in power and perhaps the first in efficiency in the world.

Was this feat accomplished by prodigal expenditures in building vessels and other material of all kinds, and enlisting and commissioning a large number of officers and men? No, the expense was less than that of building our navy, even if a liberal allowance be made for the relative cheapness of things in Germany; and the mere enlisting and commissioning of officers and men was the simplest part of the undertaking.

How was it accomplished? In the simplest way imaginable: by following Moltke's plan of solving hypothetical war problems, and adapting the military war game (*kriegspiel*) to naval forces; playing numberless war games, and deciding from those games the naval strategy best adapted to Germany's needs—not only in matters of general principle, not only as to tactics, training, education, cooperation with the army, and the size of fleet required to carry out the policy of the nation—but also as to the composition of the fleet, relative proportions of vessels of the various type, and the characteristics of each type. Nothing was left to chance; nothing

was decided by guessing; no one man's dictum was accepted. The whole problem was attacked in its entirety, and a general solution found; and after this, the various divisions and subdivisions of the problem were attacked and solved, in obedience to the same principles, in accordance with the results obtained at *kriegspiel.*

If a very large and complicated engine of new pattern is to be built by any engineering company, no casting of the smallest kind is made until general plans have been outlined, detailed plans prepared from these, and then " working plans " made for the workmen. From the working plans, the workmen construct the various parts; sometimes in number several hundred. Finally, the whole intricate machine is put together, and the motive power applied. Then all the parts, great and small, begin their allotted tasks, each part perfectly adapted to its work, not too large and not too small; all working together in apparent confusion, but in obedience to law—fulfilling exactly the will of the designing engineer. So, the vast and new machine of the German Navy was designed in the drafting room of the *kriegspiel;* and though it has been gradually strengthened and enlarged since then, each strengthening piece and each addition has been designed in accordance with the original plan, and has therefore harmonized with the original machine. Thus the navy has expanded smoothly, symmetrically, purposefully. No other result was to be expected: the strategy having been correct, the result was correct also.

Perhaps one contributing factor to the success of the German Navy has been her staff of officers highly trained in strategy by *kriegspiel,* that ensures not only sound advice in general, but also ensures that at any time, night or day, a body of competent officers shall be ready at the Admiralty to decide what action should be taken, whenever any new situation is reported. This factor is most important; because in naval and military operations, even in time of peace, but especially in war, events follow each other so rapidly, and momentous crises develop so suddenly, that the demand for action that shall be both wise and instantaneous, is imperative. The chess player can linger long over his decisions, because his opponent cannot make his next move meanwhile; but in warfare no such rule or condition can exist. In war, time is as vital a factor as any other: and the strategist, who, like Napoleon, can think faster, and decide more quickly and accurately than his antagonist is, *ceteris paribus,* sure to win;

and even if *ceteris* are not quite *paribus,* his superior quickness and correctness will overcome great handicaps in material and personnel; as the lives of all the great strategists in history, especially Alexander and Napoleon prove convincingly. To bring a preponderating force to bear at a given point ahead of the enemy—to move the maximum of force with the maximum of celerity—has always been the aim of strategy: and probably it always will be, for the science of strategy rests on principles, and principles never change.

Thus while we see in Great Britain's Navy an example of the effect of a strategy continuous and wise, conducted for three hundred years, we see in the Japanese and German navies equally good examples of a strategy equally wise, but of brief duration, which started with the example of the British Navy, and took advantage of it.

The German and Japanese navies did not follow the British Navy slavishly however; for the national military character of their people required the introduction and control of more military and precise methods than those of the primarily sailor navy of Great Britain. We see, therefore, a curious similarity between the German and Japanese navies, and very clear evidence in each of the engrafting of purely military ideals on maritime ideas. And we see not only this, we see the reaction on the British Navy itself of the ideals of the German and the Japanese, and a decided change during the last ten years from the principles of "the blue water school"; as evidenced mainly by the institution of a Naval War College, including a War Staff, the employment at the Admiralty of general staff methods, though without the name; and the introduction into naval methods, especially naval gunnery, of mathematical procedures.

Previous to the Japanese-Russian War, ten years ago, the strategy of the British Navy may be characterized as physical rather than mental, depending on a superior number of ships and men; those ships and men being of a very high grade individually, and bound together by a discipline at once strict and sympathetic. All the personnel from the highest admiral to the humblest sailor prided themselves on being "British seamen," comrades of the sea, on whom their country placed her ultimate reliance. Maneuvers on a large scale were held, target practice was carried on

with regularity—and navy ships carried the banner of St. George over every sea, and displayed it in every port. Tactics and seamanship filled the busy days with drills of many kinds; but strategy, though not quite forgotten, did not command so large a portion of the officers' time and study, as it did in Germany and Japan. The rapid success of the Germans and Japanese, however, in building up their navies, as instanced by the evident efficiency of the German fleet almost under the nose of England, and the triumph of the Japanese fleet in Tsushima Strait startled the British Navy out of her conservatism, and caused her to proceed at full speed towards the modernization of her strategy. With the quick decision followed by quick action, that characterizes the seaman everywhere, the British instituted a series of reforms, and prosecuted their efforts with such wisdom and such vigor, that, in the brief space of ten years, the British Navy has been almost revolutionized. As in all such movements, the principal delay was in bringing about the necessary mental changes; the mental changes having been accomplished, the material changes followed automatically.

The change whereby the German and Japanese navies became preceptors to their preceptor is like changes that occur in everyday life, and is one of many illustrations of how a young and vigorous individual or organization, endowed with proper energy and mentality, can appropriate whatever is valuable for its purposes from its elders, and reject whatever those elders have had fastened on them by circumstances or tradition; and develop a superior existence. It is a little like the advantage which a comparatively new city like Washington has over an old city like Boston, in being started after it was planned, instead of being started haphazard, without being planned at all.

The United States Navy was started not like the city of Washington, but like the city of Boston. It was modelled on the British Navy; but since the United States has never taken an interest in its navy at all comparable with that taken by Great Britain in its navy, and since our navy has been built up by successive impulses from Congress and not in accordance with a basic plan, the lack of harmoniousness among its various parts reminds one of Boston rather than of Washington. Due to the engineering and inventive genius of our people and the information we got from Europe, inferiority has not occurred in the units of the material: in fact,

in some ways our material is perhaps the best of all. Neither has inferiority been evidenced in the personnel, as individuals; for the excellent physique and the mental alertness of the American have shown themselves in the navy as well as in other walks of life.

In strategy, however, it must be admitted that we have little reason to be proud. We do very well in the elementary parts of the naval profession. In navigation, seamanship, gunnery, and that part of international law that concerns the navy we are as good as any. But of the higher branches, especially of strategy, we have little clear conception. How can we have? Strategy is one of the most complex arts the world contains; the masters in that art have borne such names as Alexander, Cæsar, Nelson and Napoleon. Naval strategy is naval chess, in which battleships and other craft take the place of queens and other pieces. But it is a more complicated game than chess, for the reason that not only are their more kinds of "pieces," but the element of time exerts a powerful influence in strategy while it does not even exist in chess. The time element has the effect not only of complicating every situation, but also of compelling intense concentration of mind, in order to make decisions quickly; and often it forces decisions without adequate time for consideration, under circumstances of the utmost excitement, discomfort and personal peril.

One dislikes intensely to criticize his own country, even to himself. But when a naval officer is studying—as he should continually do—what must be done, in order to protect his country from attack by some foreign foe, it would be criminal folly for him to estimate the situation otherwise than honestly: and to do this, it is necessary to try to see where his country is weak and where strong, relatively to the possible foes in question. If we do this, and compare the strategical methods employed by—say Germany and us, we are forced to admit that the German methods are better adapted to producing economically a navy fitted to contend successfully in war against an enemy. In Germany the development of the navy has been strictly along the lines of a method carefully devised beforehand: in our country no method whatever is apparent; at least no logical method. Congress, and Congress alone, decides what vessels and other craft shall be built, how many officers and men shall wear the uniform. It is true

that they consult the report of the Secretary of the Navy, and ask the opinions of some naval officers: and it is true that the Secretary of Navy gets the opinions of certain naval officers including the General Board, before making his report. But both the Secretary and Congress estimate the situation from their own points of view, and place their own value on the advice of naval officers. And the advice of these naval officers is not so valuable, possibly, as it might be; for the reason that it is really irresponsible, since the advisers themselves know that it will not be taken very seriously. The difference between the advice of men held responsible for the results of following their advice, and the advice of men not so held responsible, is well recognized, and is discussed fully in the reports of the Moody and the Swift Boards on the organization of the Navy Department. Furthermore, our officers do not have the machinery of the *kriegspiel* to help them. It is true that at the Naval War College, a war game apparatus is installed and that war games are played, and war problems solved; but the officers there are very properly engaged in the regular work of a War College, in educating officers in the principles of warfare, and have little time for other work. It is also true that the war games and problems there do lead occasionally to recommendations by the War College to the General Board as to various matters; but the connection between the conclusions of the War College and the decisions of Congress via the General Board and the Secretary of the Navy is so fragile and discontinuous, that it may truthfully be said that the influence of the war games at our War College has but a faint resemblance to the determining force of the Kriegspiel in Berlin.

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SOME OBSERVATIONS ABOUT DISCIPLINE

By COMMANDER H. B. PRICE, U. S. Navy

It is occasionally remarked by observant officers that there is a tendency in the American Navy to concentrate effort on material somewhat to the neglect of the discipline of the personnel. There may be cause for such a view. All recognize that a well-disciplined personnel, with the very best material, is the combination requisite for efficiency in the navy. It is assumed that every American naval officer is earnest for the greatest possible efficiency of the navy. It may be that some rather overlook or undervalue certain factors that contribute to efficiency in their predilection for and interest in other factors.

Perhaps the temperament is such that it seems easier, more natural, to be interested in tangible, material things than in what may be considered a matter of ethics. Some may be prone to consider themselves "practical men" with some complacency, without analyzing closely enough just what that means as applied to a naval officer. Some introspection should be of interest and benefit.

Discipline is so important and essential a component of an efficient navy, and in this country is so intimately associated with personality, that it is well to give thought to the subject in a comprehensive way, as well as to the details thereof. Such deliberative thought should supplement the inculcation of habits of discipline that enters into all naval training, especially the training at the Naval Academy. The intent of this article is to invite such thought, especially on the part of the younger officers who otherwise may fail to comprehend fully their opportunities and duty in the matter of discipline. "Experience is the best teacher" is a common aphorism. But experience in the administration and

workings of discipline involves years that might be made the more useful by timely suggestions from the observation and experience of predecessors in the work.

The American Navy has fewer officers in proportion to the enlisted personnel than have other important navies. This condition implies, among other things, that our chief petty officers and petty officers incur relatively more importance and responsibility in their various duties than may be the case in some other navies. One of these duties, of fundamental importance, is disciplinary. All new enlistments are in the lower ratings, while nearly all petty officers and chief petty officers are continuous service men. The newly enlisted men imbibe their conception of and respect for discipline very largely from the precept and example of their petty officers and chief petty officers. This holds especially at the training stations and receiving ships, where first impressions are received, and where present exigencies do not permit of detailing enough officers for them to come much into contact with the men individually. At these stations and ships the few officers on duty must manage, instruct, and train the men of lower ratings in groups, principally through the chief petty officers as intermediaries. Chief petty officers are men who have won their ratings by demonstrated ability. They are men of action and intelligence. But, as a class, they are prone to consider themselves as "practical men," are inclined to interest themselves principally in material things, and are not naturally given to abstract reflection on ethical fundamentals. The wisdom of Article 3401 of the U. S. Navy Regulations is obvious, and especially of the last paragraph thereof. It is highly important that every executive officer require the recipient of every acting and permanent appointment to read aloud to him Article 3401—not in a perfunctory way, but thoughtfully and understandingly.

While executive officer, the writer made it a practice to question petty officers, after they had read aloud to him Article 3401 upon receiving an appointment, as to their understanding of the words and phrases. "Petty officers shall show in themselves a good example of subordination, courage, zeal, sobriety, neatness, and attention to duty. They shall aid to the utmost of their ability in maintaining good order, discipline, and all that concerns the efficiency of the command." It was observed that the most com-

mon misconception was as to the meaning of "discipline." Frequently a man's definition of the word was "discipline means getting punished when you do wrong." And perhaps this significance, more or less unformulated, attaches to the word "discipline" in the minds of many. Some men seem inclined to the wrong rather than to the right. These cases are conspicuous, for most men are reasonable and hence amenable to discipline. With those insubordinate to reason, or discipline, it becomes necessary to administer some "chastisement inflicted by way of correction and training"; or, in the vernacular, to "discipline them." Hence, these cases being conspicuous because unusual, there has arisen an erroneous and very inadequate conception of the meaning of "discipline."

The expression and the thing "discipline" is so finely interwoven throughout the whole fabric of the navy, that it seems incumbent upon officers to consider well what it really is. Its scope is all-embracing, and it is the very foundation of the establishment. Hence it is a serious duty for every officer to give to the subject "discipline" such thought as may penetrate through the superficial to a broad basic understanding of it. And then officers, and especially the younger ones who come into the more personal contact with the enlisted men, may tactfully expound and explain to their men at opportune times what this thing "discipline" really is, its absolute necessity to any effective organization, its resultant personal benefit to every individual living under ship-board conditions, its salutary principles which ensure the greatest good to the greatest number, and the consequent obligation of every individual to observe all matters of its details as they apply to him. The enlisted personnel of the navy constitute a type, distinctively American. This collective type responds to leadership with greater alacrity and zeal, than to driving. It is an active, intelligent type, jealous of the individuality of its units. It is a type capable of comprehending the basic spirit of "discipline" and yielding the most effective response thereto. It is a type that may intelligently take into account those inherent idiosyncrasies of human nature that necessitate certain distinctions, forms, formalities, and ceremonials as adjuncts of discipline.

Discipline and authority are co-ordinate. Each is a function of the other, and neither can be conceived without its complement. Authority is vested by the people in certain specific offices, and in

these offices certain designated individuals must have the duty of exercising the authority thereof. Human limitation precludes that one individual can exercise necessary authority in all the ramifications of details inherent in a big organization. Hence there must be a connected chain of authority. This necessitates gradation of authority and responsibility, which has its logical application in "rank." Thus every thinking man will regard the individuals holding the various grades or ranks as links in the chain necessary to avoid chaos, and will respect them accordingly as the personification of authority. Responsibility necessitates authority; and responsive, loyal co-operation of each subordinate (which is an element of discipline) is essential to the whole. Loyalty to an individual is supplemented and strengthened by loyalty to principle, loyalty to duty in a righteous cause, whereof the personages, superior and subordinate, are factors.

In Webster's New International Dictionary (1912) the noun "discipline" is defined as follows: "The treatment suited to a disciple or learner; education; development of the faculties by instruction and exercise; training, whether physical, mental, or moral. Training to act in accordance with established rules; accustoming to systematic and regular action; drill. Subjection to control; submissiveness to order and control; control; habit of obedience. Correction; chastisement inflicted by way of correction and training; hence, training through suffering." (Further definitions of the word in its ecclesiastical usage are given). Other dictionaries are in substantial accord with the above. One definition given in Funk and Wagnalls' Standard Dictionary is: "A course of exercise and practice in order to bring and keep under control, and to qualify for harmonious and effective action; as, military or party discipline."

The following quotation is from the Universal Encyclopedia: "Discipline, Military: The training and educating the soldier or sailor in all the duties of his profession, and the implanting of that respect for authority which causes him to obey without question the legal orders of his superiors under all circumstances, even to the unhesitating sacrifice of life. It cannot be obtained without good organization and thorough and continued instruction. It is the essential factor in preserving the zeal, spirit, and confidence of troops under the depressing influence of defeat, as well as in restraining the excesses and preventing the demoralization which

result from victory. The term is frequently, but improperly, so restricted in its meaning as to include only instruction in drill, and the punitive or disciplinary measures used in armies and navies.

There is existent a vague feeling that "discipline" is a something inconsonant with the liberty of the individual, opposed to personality. And discipline does deter and correct the erring and check or guide eccentricities of personality. But through discipline are developed such attributes or qualities as faith, loyalty, honor, respect, heroism, fortitude, self-subordination, and self-control.

Discipline, in its broad true meaning, cultivates and brings to fruition the finest traits of man. There is no limit to the reach of discipline. Recently our whole naval service has given increased thought to doctrine and indoctrination, healthfully stimulated thereto by War College teachings and by articles on the subject that have been printed in the NAVAL INSTITUTE. "Indoctrination" is one of the highest forms of disciplinary action. In the article "The Great Lesson from Nelson for To-day," is impressively presented the method of its application by that man of genius.

Successful administration of discipline in its various phases and degrees is to a large extent a function of the common sense and integrity of the administrator. Precept and example form an important disciplinary duty. The "Articles for the Government of the Navy of the United States" are established by Act of Congress. These articles were based on accumulated experience. They were adapted and applied to our naval service, and have from time to time been amended or revised by Congress. There is nothing haphazard or accidental about these "Articles." It then must be regarded as significant that the opening of Article I reads: "The commanders of all fleets, squadrons, naval stations, and vessels belonging to the navy are required to show in themselves a good example of virtue, honor, patriotism, and subordination." The plain inference is that to be in themselves a good example of discipline is a duty highly incumbent upon all officers. The influence of personal example is especially strong under the conditions of life on board ship, where the necessarily close association brings intimate acquaintance with individual traits and habits. This is a disciplinary duty especially worthy of the consideration of young officers. A large majority of the enlisted men are young men. Very many of them have been in the navy but a short time.

Many among them are unsophisticated, many of them are homesick and long for some little kindly individual attention; but they don't want anybody to find that out. They are gradually acquiring a knowledge of and familiarity with their new life in the navy. They are impressionable, and eager to adopt the habits, the expressions, the manner, the general tone that will stamp them as seasoned man-o'-war's men. The entire navy is a perpetual training service. The average enlisted man regards the general bearing and phraseology and deportment of the officer more seriously than the young officer himself may think. Both are young. There exist the common understandings and sympathies, as well as antipathies, of youth. The younger officers are the ones to whom the enlisted men reveal their troubles and trials and temptations, the ones of whom they ask counsel and help, the ones whom they feel will understand. With this bond "youth," supplementing his status as an officer, the young officer of tact and discernment has peculiar opportunity to influence his men for good. Perhaps sometimes he feels himself so new, so immature in matters of practical naval life, that diffidence too much constrains him in his ship duties. His principal effort may be to remain inconspicuous, so as to avoid the mistakes resultant upon activity without experience. But he has had at least the experiences of practical cruises added to his Naval Academy career, and it is incumbent upon him to assume the duties of his status as an officer. He may greatly promote discipline by taking opportune times to explain to the men the nature of the purpose of ship's organization; the necessity of neatness, order, and personal cleanliness; the propriety and purpose of uniforms as a feature of naval organization and discipline, stimulating a pride in keeping the uniform correct, clean, and mended, as an outward evidence of capability and self respect. There are too many practical examples of such procedure for this to be regarded merely as a theory. And where junior officers in a division do thus, the petty officers soon catch the spirit. Intelligent men most efficaciously acquire the "habit of obedience" when they understand the principle involved and habit is co-ordinated with reason. This does not imply questioning of orders or dilatoriness in obeying. The men will the better realize the common sense of these details of discipline. Such procedure is analagous to the method of instruction indicated in the "Ship and Gun Drills, U. S. Navy, 1914." For example (p. 53)

"The crew should always understand why each detail of the drill is necessary."

Another obvious manner in which the younger officers may specially promote discipline is in connection with athletics and entertainments. The benefit of Naval Academy athletics should, through the succeeding years, expend from the individual graduate to the betterment of many young men. It is perfectly natural that the vigorous young enlisted man should have an increased respect and liking for the young officer who can "show him how" in athletics as well as in naval technical things.

On every vessel of the navy numbers of men, up to a thousand on the larger ships, live in restricted space, under artificial conditions new and strange to many of them. A large percentage of them are in their first enlistment. Only about 20 per cent of applicants are enlisted. The newly enlisted are young men, virile, vigorous, restive, representing all parts of the country and many conditions of life, but generally lacking previous disciplinary instruction and training. There lies the potentiality of large good or great evil. Dormancy is impossible. Activities must be guided aright. A fundamental of good discipline is to keep everybody interested and busy in an orderly way at something useful. Officers and men are primarily interested in and busy at their work, drill, and instruction. But there must be some diversity. There must be relaxation and recreation. There must be vent for animal spirits. And there the young officers have a peculiar opportunity for good. The young officer who, in addition to his regular ship duties, leads and organizes and instructs in one of the various branches of athletics, in entertainments, in singing squads, in everything that aids in wholesome recreation tending toward moral and mental and physical betterment, is by that much the better officer and disciplinarian. His is the influence that may effectively "squelch" those ever-present individuals who pose as "sports" to gamble on athletic events or institute trickery, whom the crew will discredit when they comprehend their pernicious influence on clean sport and discipline. If he is of the right stuff (and most are), and capable in what he undertakes, such activities will not at all compromise his status and authority as an officer. They will enhance his value. Of course, the officer must never indulge in or permit any familiarities, which would transgress the dignity of his

status as an officer. But with the type of officers and enlisted men in the U. S. Navy, the status of the officer is not compromised by dignified helpful direct intercourse with the men under him, or by his interest in their individual instruction and welfare, or by leadership in their sports and recreations. Firmness and kindliness, respect and association, dignity and interest, are incompatible.

Exact military decorum and movements in all formations, correctness and neatness of uniforms, and personal and ship cleanliness, are adjuncts of discipline that must be obvious to all. But there are some things detrimental to discipline that often are overlooked, that a little thought would render obvious. For example: Men dislike or resent being touched or having any part of the uniform they are wearing handled by an inspecting officer, and especially by a junior officer. They may not convey their feeling to the officer but it is existent. Disregard of that feeling on the part of an inspecting officer is detrimental to discipline, and there never is need or excuse for an officer, in criticizing or correcting a fault in clothing worn by a man, to touch it. Also, the general use of the common expression " right away " in connection with an order is detrimental to discipline, in that the men may (and sometimes do) come to think that unless an order has the suffix " right away," it may be executed at their convenience or leisure. An order should be short, clear, and distinct, and its immediate execution a matter of course unless otherwise specified in the order itself. The pernicious " right away " has no place in an order.

Summarizing.—The enlisted men in the American Navy are volunteers. They are carefully selected. They are young. They are intelligent. They have individuality and cherish it. They are responsive to the tenets of discipline. They are susceptible to example. They disdain mollitude, but are appreciative of a proper interest in them and in their behalf on the part of their officers. It is a fundamental duty of officers to study discipline in its broad meaning; to study character and endeavor to understand the general traits of their men, as well as individual cases; to establish in themselves a good example of discipline; to utilize all their disciplinary opportunities; to inculcate in all their subordinates an understanding of, a respect for, an adherence to discipline in the abstract and in the concrete.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

WANTED! A NAVAL MILITIA MISSION

By LIEUT. COMMANDER ROLAND R. RIGGS, U. S. Navy, Retired,
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We are not a military nation, and we probably never will be. It is a fact too well known to the Service to need to be demonstrated that our wars in the past have been prolonged, if not actually caused, by our failure to grasp military situations. President Wilson in his writings, has referred to the War of 1812 as a conflict of arms brought on by a program of peace. Our ultimate complete or partial success in these conflicts has blinded us to the enormous toll in blood and treasure with which these results, such as they were, have been purchased. We have always relied on a system of volunteers to do the work of trained military forces, and trusted more to the spirit of our people and the justice of our cause, as we saw it, than to military skill and preparedness. Ghastly as have been the results of this "system" on land, it must be said that on sea we have so far found it eminently successful. The splendid pages in our naval history have, almost without exception, been written by men who were trained for their work outside the naval service. The secret of this is easy to discover. The men who entered the navy from the merchant service were men who were thoroughly familiar with their duties, in sad contrast to the raw militia and volunteers on land. These reserves for our naval forces were taken almost wholly from our merchant marine. Many seamen served alternate cruises in the navy and in the merchant service. The ships of the two services differed little in construction or rig. By far the most important duties of both officers and men were those connected with seamanship, and these duties could be learned as well in one service as in the other. Gunnery was a most elementary art, and even this could be learned in the seagoing merchant ship, as most of these were armed, and some

quite heavily. In fact, the work of the navy and of the merchant service was so closely allied that merchant ships were fitted out as privateers and frequently met and captured men-o'-war of greater size. To give a list of naval officers who received at least part of their training in the merchant service would be to name practically every well-known naval hero from the days of Paul Jones down to the period of the Spanish War, and a great many more, too. Even the advent of steam did not materially change these conditions.

To-day, however, all this is a thing of the past. The two points which make the reliance on a reserve from the merchant service a slender reed on which to lean in war time are, first, that we have practically no seagoing merchant marine to-day, and second, that it would be of little military value if we did have it. It is needless to point out that seamanship, as it is understood by the merchantman, plays but a small rôle in the duties of the modern navy. The latter has become a highly specialized profession, and is no more related to the merchant service, just because both follow the sea, than is railroading or engineering related to the army, because both are ashore.

The fact that the navy must look to some new source besides the merchant service to supply its depleted ranks in time of war was recognized as far back as 25 years ago, and state naval militias were formed in many of the coast and lake cities. The worth of these organizations was demonstrated in the Spanish War, when they supplied the navy with about 3400 officers and men, and manned in whole or in part, 20 vessels. The splendid showing made by most of these organizations in the war gave renewed vigor to the movement, and resulted in more states forming naval militias, and in a general increase in numbers and efficiency. But the Spanish War had demonstrated not only how valuable the militia might be made, but also its weaknesses under the system as it then existed. To improve conditions in the land forces, the so-called Dick Bill was passed. Encouraged by the success of this measure, the Navy Department succeeded in having Congress enact a similar measure for the benefit of the naval militia. This act was signed February 16, 1914, and provides that certain sums be appropriated for arms, uniforms, equipment, etc., for the naval militia; it provides for a certain amount of training with the fleet each year, and for pay while under this training; it authorizes the

loaning of certain vessels of the navy to the militia for purposes of instruction; and provides for the detailing of officers as inspector-instructors. To receive the benefits of this bill, organizations are required to come up to a certain standard set by the department, and they are given three years from the passage of the bill to come up to the mark. It is certain that no organization can exist without this aid, so the deplorable lack of uniformity and failure to reach a common standard, which has so handicapped the militia in the past, cannot obtain much longer. While some organizations, favorably situated, and aided by wise and liberal state administrations, have, by their own efforts, attained a really high state of efficiency, it must be frankly admitted that others are not so efficient. By the terms of the Naval Militia Act, these organizations, good, bad, and indifferent, become in reality a part of the naval service. Their efficiency is not solely a matter of local concern, but is, or should be, a matter of interest to the whole Service. As any officer in the navy may be called upon to perform duty with the militia, in peace or war; as the navy is deplorably short of men, on a war footing; as the naval militia is to-day the only existing reserve on which the navy may depend to make good this shortage; it becomes the duty of every officer of the navy and of the militia to devote attention to the problem of how this important auxiliary branch of the navy is to be made more valuable to the nation.

It is necessary first to consider the need for an auxiliary naval force. Three naval officers, with all the data available at their disposal, recently estimated the shortage of the navy in enlisted men. One made it 50,000, and the other two, each working independently, made the shortage 55,000. The lowest estimate of the shortage, made by competent authority, is 30,000, and this does not take into account the men needed to fill vacancies caused by casualties, or for extra men needed for new recruiting parties and other shore details in war time, etc. On October 1, 1915, the Atlantic battleship fleet *alone* was 5600 men short of war strength, an average shortage of about 250 per ship, or over 25 per cent of full complement, while the vessels in commission in the whole Atlantic fleet were about 7800 men short. In regard to officers the conditions are quite as alarming. It has been estimated that if it were possible to commission all our ships on a war basis, and to send every line officer on the active list, commissioned and war-

rant, to sea, we would still be some thousand officers short, not counting the shortage at the shore stations, which would be swept clean of officers. Whatever the exact shortage may be, and however it may be calculated, the fact remains that the Service and the country are facing a very serious condition, which must be squarely met. It would be a physical impossibility to-day to commission the reserve ships or to put the fleet on a war footing. Congress undoubtedly will seek to remedy this condition to a moderate extent, but it must be borne in mind that an increase of say, 6000 men would only be just enough to fill the vacancies on the battleships which we now have *in commission,* and these men could not be available inside of many months at the least. No great naval power keeps all its ships on a war footing in time of peace, and it is idle to hope that we will ever do it. So whatever increase in officers and men may be allowed, we may rest assured that there will still be a very material shortage on a war basis. It is true that this condition exists with the other great naval powers, but we differ from them in one important respect. Realizing that they could not keep on a war footing at all times, they have, without exception, turned their attention to the very important subject of a naval reserve. Great Britain had a reserve of about 140,000 trained officers and men at the outbreak of the present war, while Germany had about 100,000. The exact figures for the other powers are not available, but it has been estimated that in each case the reserve was about equal in numbers to the regular forces. Our own organized reserve consists of about 600 officers, and about 7900 enlisted men, of varying degrees of efficiency. For the reasons previously given, our merchant service, which has stood the navy in such good stead so many times in the past, no longer has the importance which once attached to it as an auxiliary naval force; so it behooves us to find some new and adequate reserve. Whatever the future may bring forth, there is at present but one organized reserve, and this is the naval militia. How this may be increased in numbers, efficiency, and value to the country, is the subject of this paper.

No progress in the solution of this problem can be made unless two things be kept clearly in mind—the capabilities as well as the limitations of the militia. One is as important as the other, and neither can be too strongly emphasized.

It is too self-evident to require demonstration that the training of the naval militia cannot progress along logical lines unless the object of the training be in plain view—in other words, unless there be an estimate of the situation. It is startling, but true, that for the 25 years during which the naval militia has been existent, such an estimate has never been made, or if it has, it has been kept a profound secret. No comprehensive, logical, plan for the employment of the naval militia in time of war has ever been promulgated, and I repeat, that unless we know exactly what the goal be, we will go far afield in our endeavor to reach it. This point is most strikingly illustrated by the general supposition, by people who have never given the problem intelligent study, that what is good and logical for the navy must be good for the militia. In other words, that the militia is to be a little junior navy, paralleling in all possible ways the doings and drills of the older service. Nothing is more fundamentally wrong, and the sooner this idea be dropped the better for all hands. The navy has its purposes; it is the function of the naval militia to *aid the navy* in accomplishing these purposes, and not to attempt the accomplishment itself. The clearest example of this fallacy is found in connection with target practice. Undoubtedly the only *raison d'être* for a navy is to hit the enemy as rapidly as practicable, with the least expenditure of ammunition. It is *not* the function of the naval militia to do this: *its* function is to *help the navy* hit the enemy. This is the problem, undoubtedly. How best may it be solved? First consider the limitations and capabilities of the militia in this respect. I shall attempt to show later on that if every available minute of drill time were utilized in training gun-pointers and crews, that the militia still could not hope to compete with the navy in gunnery. And, of course, no one for a minute would suggest devoting *all* available time to this one subject. Also, the only practical way to train gun-pointers is with the check-telescope in the open sea, with the natural roll of the ship. This method is not available for the militiaman except for brief periods during the summer, and even then I believe his time could be better employed. I don't mean to say that, now and then, a good pointer is not found in the militia, but their very rarity shows that they are the exceptional cases, and not the product of the training. When such natural gun-pointers are available, by all means utilize them, but don't make gunnery the alpha and omega of the militiaman's training. Even if it were

possible to develop good gun-pointers and trained crews without neglecting more important work (and I don't believe for a moment that it *is* possible), still I believe the training would be largely unproductive, because the cases where naval militiamen will be assigned as gun-pointers on fighting vessels in time of war will constitute such rare exceptions that they may be neglected in any general scheme of training. Here again the lack of a definite policy is felt.

Then there comes the question of convenience. The whole itinerary of the summer cruise, which is brief enough at the best, is made to depend on a time and above all on a *place* where target practice may be held. This almost invariably so circumscribes the movements of the cruising ship that the interest in the cruise is lessened. Tangier Sound and Gardiner's Bay are not the most interesting places on the map. If new and interesting places can be visited, the enthusiasm for the cruise can be enormously increased, with corresponding gain in spirit, attendance, and results. Then again, an interesting cruise is the best possible means of recruiting, while a dull one has the reverse effect. This effect, either way, is increased with a knowledge that the department is going to follow one course or the other. I am well aware that people are apt to reply to this, that the cruise is intended for work and instruction, and not as a junket. Perfectly true; but it must be borne in mind that a great majority of militiamen give up their only vacation of the year to make the cruise. They don't object to work, but it can be sugar-coated. If the itinerary is well planned, and the instruction is given by competent, patient instructors, with an insight into what they are driving at, the cruise will be a success, the men will want to go again, and they will get their friends to enlist and go next year. If the cruise be otherwise, the men simply will not re-enlist, and they will not get their friends to enlist. The fact that all recruiting is dependent on the enlisted men in each division is a point never to be lost sight of by the naval officer. It is a condition he does not have to face, and rarely considers. But to return to the subject. Holding target practice during the cruise undoubtedly limits the itinerary, and frequently spoils the effect of the cruise. *Some* good may come of it, but this in no way equals the benefits lost.

There is even a worse aspect to target practice than those already touched on. Everyone in the navy knows that for a period

of at least two weeks—generally more—preceding target practice, the whole ship is turned topsy-turvy. For a few days she is "mad." Now imagine putting a green crew aboard ship, and putting to sea the same day, and attempting to hold target practice within a week or ten days *at the most*. When the crew is composed of militia officers and men, to whom ship life is necessarily strange, and is accompanied by a nucleus of men hastily gathered from a dozen ships, generally disgruntled, unfamiliar with their new ship, and taking no interest in her, as they expect and hope soon to return to their own ships, can you picture the results? No, you can't, unless you have seen it, as I have. At the best it is a mere travesty on target practice; at the worst, ... When you consider that the only glimpse most of these men get of naval life and conditions is under such circumstances, the marvel is that anyone ever wants to make a second cruise. Certainly the service appears in the worst possible light. On these federal cruises, every effort should be made to whip the raw material into shape and keep it there. This is vastly more important than chasing will-o'-the-wisps in the guise of targets.

Another field in which the attempt to force a false analogy between the navy and the militia is found in the instructions of officers. In the navy, "amalgamation" of duties is an unqualified success. Every officer is liable to be detailed to engineering duties; a knowledge of electricity is essential; he will surely be a watch and division officer, have a battery or turret, and in time looks forward to being gunnery officer, navigator, executive, commanding officer and, finally, to fly his flag. Above all, he may be detailed to any one of these duties at a moment's notice, or he may be called upon to perform several of them at once on a small ship. Such is not the case with the militia officer (at least it should not be if we had a plan of action). Yet so little is this understood, that it was seriously considered making deck officers qualify in engineering, and *vice versa*, under the Naval Militia Act. I can say, without hesitation, that had such provision been adhered to, it would have been fatal to the naval militia; yet the same failure to grasp the fundamental differences of the services is illustrated, though in a less vicious form, in the requirements for navigation. If we will frankly estimate the situation, it must be admitted that the number of militia officers who will be called upon to use astronomical navigation in time of war almost reaches the vanishing point. The

average junior officer of the navy is of necessity much more expert in the knowledge of this science and the practice of the art than any but the exceptional militia officer can hope to be. Here and there will be found an officer who, by education and taste, has developed into a thoroughly competent navigator, but it has been entirely through his own efforts, and not through any system of general training. Such men should be encouraged and given every possible assistance. But to require the average officer to attain an equal degree of proficiency is pure waste of time. It is worse than that! An officer will give just so much time to the naval militia, and then he reachese his elastic limit. If he be *required* to put in a lot of time at navigation (which he probably detests), just so much time is being taken from work which there is a good probability he will be required to perform, and which he is by nature and education fitted to perform. In other words, the militia officer must be a specialist to the last degree to be good at anything. If you try to teach him too much, he will learn nothing well, and a good militiaman will be spoiled to make a poor navalman. A naval militia officer can be taught to perform *any one duty* quite as well as the average naval officer. Of this I am quite certain. He can rarely be taught more than one duty thoroughly. Of course, there are exceptional officers, but no general scheme of instruction can be based on them. The problem then becomes: Make up your mind what jobs are to be filled by naval militiamen, and train each man to fill *one* of these jobs, and then *leave him at that job*. Next, sort out the square pegs from the round pegs, and put each in the hole where it fits. In other words, don't take the chap with a bent for navigation, and who may not be very forceful, and assign him to a watch and division, while at the same time an officer who is a born leader of men, but has not had a college education, is made navigator, when he detests navigation. And when a man is once assigned to his job, don't disturb him unless he be clearly the man for the new job. Two or three officers who are skilled in astronomical navigation are of much more value for navigational purposes to an organization, than are 20 officers each with but a smattering of it. It must be remembered that with the time at your disposal you can teach an officer just so much, and no more. Why not concentrate on the work in which he is interested and which he *can* learn creditably? Simple as this seems, it is rarely grasped by either the naval officer or the militiaman.

Each new inspector-instructor starts a class in navigation (Is it because it is easy for him to teach this subject?) and each ship's captain demands particular attention to the watch officers' work in navigation, regardless of how much his division may need his attention. It is to be noted that the above strictures apply solely to *astronomical* navigation. Every watch officer should be familiar with coasting and piloting, and with the rules of the road, of course. They are part of his duties as a deck officer. Astronomy is not.*

I touch on these two subjects, gunnery and astronomical navigation, merely to illustrate how far afield one may go in stretching too far the analogy between the navy and the militia, or in assuming a unity of purpose where none exists in fact. Similar examples of energy directed in unprofitable channels might be given, but the two cited are sufficient to illustrate the point. This point is that the raw material at our disposal in the form of militiamen has never been properly assayed, by either a quantitative or qualitative test. Next, that without such an estimate of the material at hand, no comprehensive and logical scheme for using the material is possible. Lastly, until a definite and practical plan for employing the militia is promulgated, no logical scheme for instructing the militia is possible, as it is not known for what we are to prepare.

* The following is an excerpt from the report of Naval Militia Cruises, 1915, published since this paper was written. It tells the whole story.

Recommendations: . . . .

(6) That "line officers of the Naval Militia should be required to know piloting, but should not be required to know theoretical navigation." It would appear that it is impracticable to take civilians and make navigators out of them in the time available when they have such a multitude of other things to learn. If the Naval Militia were ever needed for service, at that time the government could obtain the services of a sufficient number of qualified masters, fresh from actual sea duty and experience, who could be used to navigate ships if necessary. As the Naval Militia officers cannot become experienced navigators, it is recommended that the navigation be separate from the line officers' duties with the exception noted above, in the same manner as the engineer officers have been separated, so that a qualified navigator can come into the Naval Militia for navigation duties only and so that the regular line officers be not required to spend time on theoretical navigation which will not be sufficient to make them qualified and dependable navigators even after years of Naval Militia service.—From report of Lieut. (J. G.) H. A. McClure, U. S. Navy Inspector-Instructor, Oregon Naval Militia.

How may all this be remedied? First of all, what raw material have we to work with? The average naval militiaman can be made to attend 30 drills, or, say, 60 hours of instruction on shore, each year. For several reasons, which do not apply to the navy, an apparently inordinate proportion of this time must be given to infantry and similar drills. In the first place, each organization must do its own recruiting, or cease to exist. To get in new members, it must be known. It must appear in local parades and functions. On such occasions it is compared with national guard organizations in its appearance and "smartness." So long as organizations are judged by the straightness of their lines, and the trim of their pieces, just so long must care be given to these matters. Illogical, perhaps, but true, and not to be overlooked. Then, reviews must be held at local armories, when fathers and mothers, and best girls, and prospective recruits with *their* sisters and cousins and aunts, can come and watch the drills and dance. You may call this unmilitary, and it is. But the militiaman must be paid in one form or another. Unless the state be prepared to pay him money, he must be given some other return for the long winter evenings which he puts in at drill after a hard day's work, frequently when he would rather be some place else. Then again, the naval militia is primarily a state organization, and liable at any time to state service. This latter is apt to be on shore, and so a certain amount of infantry, machine gun, and riot drill is essential. But above all, some form of close order, shoulder-to-shoulder formation—call it by what name you will—has been proved to be the best method of converting an armed mob into a military body. Some such drill is a necessary prelude to the periods of instruction on shore, in order to get men's minds in a military frame. The officers must learn to command, and the men to obey. The former must be taught to give their orders with a tone of authority, and to give precisely the correct order, with no variations. The men must be taught to obey an order instinctively, without question or hesitation, and in an exact, prescribed manner, with no embellishments of their own. This can best be taught by infantry, artillery, and setting-up drill. The drills are merely the means to the end, and must not be confounded with the end itself. The end, as said before, is to produce a military organization whose mind and body work as a military machine. On shipboard where you have the men under you for 24 hours a day, all year long, and where

military discipline is felt, actually or potentially, in all the little commonplaces of life, the importance of the above is not manifest. But where men come from an office and from their homes to drill but once a week, different methods are required. The above but briefly sketches the necessity for military drill in the militia. I think that I am on the safe side in estimating that not less than one third of the drill time, or say 40 minutes a night, is the least that can be given to this important subject. (Remember, about a third of your men are always rookies.) This leaves about forty hours a season for instruction in all other subjects. The average term of service is about three years. How can this time be utilized to the best advantage? This is the great problem. To solve it, one must keep constantly in mind the limitations of the naval militiaman in order to see his possibilities. It is obvious that a finished man-o'-wars-man cannot be turned out in this time in the average case (which is all we are dealing with). The sooner this truth is driven home the better; for I believe that nothing has kept the militia from "finding" itself so much as the failure to recognize this point, and thus striving for the unattainable. It is an even greater mistake to go to the other extreme and assume that nothing of value can be made of the material in the time available. If the naval militia aims to turn out several thousand men who are uniformed, organized, armed, equipped, grounded in naval discipline, familiar with the fundamentals of the naval profession, and available for service in 24 hours, it will more than earn the money appropriated for it by Congress. But this is just what the naval training stations aim to do. Exactly, and I believe that the two ends should be identical, except in some minor features to be noted later on. If the navy had a reserve of several thousand lads just out of the training station, available at a moment's notice, the value of this reserve would be apparent at once. The naval militia *can* furnish just such a reserve. To aim higher is to spoil a very valuable militiaman to make a poor bluejacket. If this be the logical rôle of the militia, and I am fully convinced that it is, it would be well to study the methods used at the training stations. The raw recruits of the navy and of the militia do not differ materially as to age and intelligence. The total periods of instruction for an average militiaman during his enlistment about equal those of the recruit at the training station for four months. The advantage of continuity of instruction in the latter case is balanced by the sum-

mer cruises of the militiaman. The instruction in each case is carried out largely ashore. The end to be attained is (or should be), the same in each case. Hence it is fairly safe to assume that the scope of instruction for the naval recruit is well suited for the militiaman. I believe this to be an accurate conclusion, proved by theory and practice. It is interesting to note that at the training station, no attempt is made to train gun-pointers and gun crews. It is realized that the proper place for this is in the fleet. The truth of this is not modified by the fact that if a great deal of time were given to this training, *some* good pointers would be *discovered*, rather than trained. Too bad this fact cannot be recognized in the militia, where there are many reasons which make it even more pertinent. It is to be noted, too, that a great deal of time is given to infantry drill, artillery, setting-up, etc., at the training stations. The remainder of the time is given to teaching the men the rudimentary lessons of ship life. In the militia this can be done conveniently by dividing the drill period of two hours into three periods of 40 minutes each. For the first period have infantry, etc. The second and third should be given equally to ordnance and gunnery, and to seamanship. Under the latter heading, teach men such things as the various ranks and rates with their distinguishing marks; ship's organization, with the general duties of the various officers and petty officers; quarterdeck etiquette; the principles of the watch, quarter and station bill, and how to read a station billet; how to scrub, mark, stop, and stow clothes; how to lash and stow hammocks; the duties of a messenger, orderly, side-cleaner, look-out on the various posts, both day and night; ship routine, including to whom to go for various things; marline spike seamanship; use of hand and deep-sea lead; types of boats; parts of boats and their equipment; how to handle a boat under oars or sail, and names of the gear; boat sails; anchor gear and ground tackle; systems of signals; duties of steersman, and of man on speed cones, telegraphs, annunciators, speed light, etc.; and a thousand and one such things. Under ordnance and gunnery should come such things as a thorough course in the care and handling of the service rifle, and its use, down to and including the qualification of marksman at least; the general principals of the construction of a naval broadside gun and mount, and the nomenclature of the parts; the duties of each man at "cast loose and provide!", "secure!" and in handling and serving the piece; the kinds of guns, ammunition,

primers, etc., in use in the navy; a more thorough knowledge of such machine gun as is furnished the organization; a small amount of drill to illustrate the principles of training with the dotter, morris tube, and check telescope; instruction in the methods and objects of the various classes of target practice. I can assure the reader that if this instruction be given conscienciously there will be little time left for the "higher education" of the average militiaman. On the other hand, this work *can* be easily assimilated, and it can be made very interesting. It is useless to teach youngsters to run before they can walk. This work can be driven home, and supplemented by instruction in the emergency and general ship drills, in the short cruises during the summer, on vessels loaned to the organizations. By the time the men are ready to go for their "federal cruise," they should be able to make a very creditable showing. Their shore instruction, amplified by a total of about a month at sea should turn out a man who, at the end of his enlistment, is the equal, if not the superior, of the product of the training station. If this be accomplished, the militia has fulfilled its greatest duty to the federal government. If not, then it has failed to grasp its opportunities.

There is one feature only in which the analogy between the work of the militia and of the training station fails. With the latter, the officers and petty officers who act as instructors are trained in the Service, while the militia has to develop its own leading men.

As I said before, the average militiaman will drill for thirty weeks a year, for about three years. But there are a number of enthusiasts—a surprisingly large number—who will give up more than one night a week, and who will remain in the service many years. From these men petty officers are developed, and from the pick of these, the officers are taken. The scope of instruction outlined above, of course, does not apply to these men. It would be useless here to attempt to lay down any scheme of instruction for petty officers, as the conditions vary so with each organization. Suffice it is to say that their work begins where the seaman's stops, and is an amplification and specialization of the latter.

In regard to the officers' instruction, I can only repeat what I said before. It is hopeless to *train* officers to be expert spotters, navigators, etc. The service is not looking for such highly technical

men. I don't mean to say that *some* militia officers cannot, or do not, become extremely proficient in almost any branch of the naval profession. What I do mean, and most emphatically, is that it is bad business to attempt to train the great body of officers in such duties. With the time and material available, they cannot generalize with any success, as naval officers do. But *any* officer can be taught one particular job, which he can perform as well as the average naval officer. There are hundreds of such jobs in the navy. Fill them in war with militiamen, and release your regulars for the more highly technical work. Size up each officer, and determine just what work he is best fitted for. Then concentrate on training him for just that work, and drop out all side issues and non-essentials. When an officer is qualified for any particular work, let this be noted on his record at Washington, and let him then and there be assigned to suitable and definite duties on a war slate, much as retired officers are now assigned. The names of such officers who have qualified for one or more classes of work might well be carried in the Navy Directory, with appropriate designations indicating the work in which they are qualified, and their mobilization detail. In this way an officer may know well in advance just what ship he will go to and what his duties will be on that ship. He can study up on the job, familiarize himself with the matériel under him, and I believe the results will be surprising.

All this presumes, however, that there is some definite plan as to how the militia is to be taken into the service. To the best of my knowledge and belief, no such plan exists and I have taken some pains to learn of any. At any rate, it is non-existent so far as the benefits which might be derived from foreknowledge of the jobs is concerned.

There are three general ways in which the militia may be taken into the naval service: (a) to fill up the complements of the reserve fleets; (b) to be taken in *en masse* as so many officers and men, and distributed through the fleet, either to fill vacancies or to release an equal number of regulars for other duties; (c) to man practically entirely small gunboats, small cruisers, auxiliaries, etc. It is useless to attempt to draw up a complete plan within the scope of this paper, and with the meager information at hand. In general, however, I can say that there are grave disadvantages to the first plan, although I am well aware that many capable

officers favor it. The best that can be said for it is that there are very few militia organizations to-day which have reached such a state of proficiency that it would be safe to try the experiment with them. It is another example of the danger of aiming at the unattainable, and thereby spoiling excellent material which would be invaluable in other and lowlier fields of endeavor. The second plan—that of distributing the officers and men throughout the fleet—I much prefer. A hundred militiamen and half a dozen officers could be absorbed into the ship's company of any battleship in no time, and under the guidance and precept of experienced officers and petty officers, they would soon be among the best men on the ship. This could be accomplished without in any way lowering the efficiency of the ship. Beyond this number, I believe that the efficiency of the ship would be pulled down rather than that of the militia raised. It reaches the extreme in plan (a), where we have the blind leading the blind. The third plan has much merit, and would probably be the best way of employing organizations composed to a large extent of sea-faring men, who may be unfamiliar with naval life. The work on these small ships is more nautical than military, and could be very satisfactorily performed by such organizations.

It is probable that the best plan would be a combination of (a), (b), and (c), each organization being assigned to the duties best suited to it. It is probable also that there would have to be two or three alternative plans, depending on the disposition of the Fleet and the time for mobilization at the outbreak of hostilities, and on the magnitude of the war and the sea power of the enemy. For instance, a plan contemplating filling vacancies in the Atlantic Fleet would be impracticable if the Fleet were far distant from home waters. Similarly, organizations which would be needed afloat against one enemy might well be used for advance base work or for mining against another power. On actual or threatened war, the Department would simply telegraph the adjutant generals of the states to have the naval militia mobilize, plan (b), for instance, and the wheels would begin to turn without more ado. But at any rate, there should be *some* plan, so that the training could fit the men and officers to carry it out, instead of trying to prepare for *any* eventualities, as at present. For instance, if reserve battleships are to be manned, the particular ships should be assigned to

particular organizations and, where practicable, should be stationed near those organizations for at least a few months each year, in order that all hands may become familiar with their duties. The plan at the department should be quite general. For instance, such a battalion should be required to furnish officers and men to fill certain designated billets on a designated ship. The duty of keeping the watch, quarter and station bill up to date is then up to the organization itself. If it cannot do this, then the job of manning the ship is too big for it. There must be a militia doctrine, and a recognized sphere of discretion for subordinates. If the latter fall down, the scheme is too ambitious.

The lack of a doctrine, and a clear conception of the object in view is shown by the arrangements for the annual federal cruise. I have already attempted to show how the holding of target practice at such times completes the disintegration of a ship's company already demoralized, and prevents its "finding" itself. It also reduces the interest in the cruise by limiting the itinerary. This is but part of the trouble. I think that it will be agreed that the object of the cruise is purely to give instruction. As conducted at present, four-fifths of the division officers' time is taken up with administrative detail, all entirely necessary, but quite unproductive of results so far as the officer is concerned. It leaves him very little time for his own instruction. In addition to this, much confusion and loss of time results from the necessary unfamiliarity of the militia officer with the ship. Men are continually coming to him for information which the briefness of his time aboard prevents him from giving. As a result he must confess ignorance, or give wrong answers. The result is confusion, loss of time, or worse yet, loss of prestige on the part of the officer. The fault is with the "system," and not with the officer. The same is largely true with the petty officers. They are required to instruct and lead the men in work which of necessity is strange to them. In addition, the instruction of the men is left almost entirely to the militia officers. This has two disadvantages. First, the officer is there to learn his own job, and not to teach other people theirs; second, as the ship's work is the side of the job on which the officer is weakest, he is apt to stay in familiar paths, and give the men very much the same instruction as they received on shore.

All these disadvantages could be easily overcome. First, realize that the cruise is designed for the *instruction* of both officers

and men. Obviously the best instructors should come from the navy. Don't have men who are trying to learn and trying to teach at the same time. Have all the militia under instruction by people fitted to instruct, and who have nothing else to do. It is surprising how easily this can be accomplished. Send the militia captain, executive, and heads of all departments, on the practice ship, as at present, and pair each with a running-mate. In performing the regular duties of the office, each officer gets the best possible instruction. Send one militia junior officer with each division of militia, and send all other militia watch and division officers to battleships in the fleet. If the militia is worth anything at all, it is worth setting aside two weeks in the summer schedule of the fleet to be devoted primarily to the instruction of the militia officers. I don't mean to disrupt the fleet for this period, but simply to arrange a series of exercises and maneuvers from which the militiaman may obtain the maximum advantage. These officers are *not* to be put on junior O. D. watch, but are to be given entire charge of divisions, and of the deck, both at anchor and underway. The regular officer of the division and of the watch is to be present whenever necessary, to give such advice and information as may be necessary; *but the militiaman is actually to run things.* This has several advantages over having the militiamen cruise with their own organizations. First, and most important, the officer can give his entire time to his own instruction, under competent guidance, and is not distracted by giving instruction to others at the same time. Next in importance, he will see a ship of the navy upon her lawful occasions, and will get some ideas how a ship *should* be run, instead of the weird travesty of naval life usually exhibited to him. I venture to say that there are many officers and men in the militia of many years service who have never had this advantage. Without it, they are groping in the dark. It must be remembered that the officer who goes with the fleet is not (or should not be), quite green. Besides thorough training in the ranks, or its equivalent, he has made at least one cruise on his own cruising ship, to say nothing of his experience on the vessel loaned to his organization. After a few cruises with the fleet, he will be able to put in practice on his own ship the things he has picked up, and he will see things from a much broader point of view than would be possible were all his service with his own organization. It is most important that the officer be *compelled* to perform his duties with

the fleet with the minimum of "nursing," or the greatest benefit cannot be derived from the cruise. Another benefit, and not the least important, is that this method would tend to promote a better *entente* between the Services. Each would better appreciate the problems of the other, and we would approach a solution of them. The navy has quite as much to learn about the militia as the latter has about the navy. I have found that the good opinion of the naval officer for the militia was proportional to his knowledge of this service. No opportunity should be lost for the mutual exchange of this knowledge.

All second-class and first-class petty officers should be sent to cruise in the fleet in the same way as the watch officers, only it would probably be found best in the long run to have them perform all the duties of seamen, for the period of the cruise. The militia petty officer can be instructed ashore in the theory of his job, but even the best of them are surprisingly ignorant of such routine matters as can be learned only on a cruising ship. These petty officers are under the same disadvantages as their officers. They are constantly called on to instruct men in ways which are strange to them, when they should be devoting their whole time to learning their own jobs, not to teaching. They rarely have a chance to learn, as they never see a "part of the ship" correctly run. The result, as in the case of the officers, is the giving of false information or none at all, with consequent waste of time, confusion, and loss of prestige. All this is obviated by the method suggested.

To supplement the above suggestions, watch and division officers and petty officers from the navy must be detailed to the militia practice ships to act as instructors. These men should not be taken haphazard from the back-channel fleet, or from ships undergoing repairs at the yard. Such people rarely take an interest in their work, as they generally resent the detail, and know that they will be detached at the end of the cruise. Frequently they are unsuited by nature or by lack of experience for the work, and occasionally are outspoken in their dislike for the duty and for the militia. Any militiaman who has made a couple of federal cruises cannot help but note the vastly different progress made under different officers. The militia is a reserve of sufficient importance to warrant having officers selected with a view to their experience, their military bearing, neatness, and above all for their patience, tact, and good humor. The average naval officer does

not appreciate how hypercritical the militiaman is, and how he is apt to be impressed by the bad rather than the good precept shown him. It is rather difficult to correct a militiaman when he replies: "Well, that's the way Mr. —— used to do it." For instance, a rather informal way of turning over a watch to one's relief may "go" when watch-standing is a daily occurrence, but it would be fatal for the amateur watch-stander to try it. One cannot be too "smart" with the militiaman. He has to be *taught* smartness; he *acquires* slackness.

Equal care must be taken in selecting petty officers from the navy to run the militia divisions. Ex-instructors from the training stations would be ideal. At any rate, they must be competent, neat, military in bearing, and have patience with a lot of young men who may appear to be stupid, but who respond wonderfully if intelligently directed. All instructors should be detailed to the ship in time to become familiar with her before the cruise.

I would keep one junior officer and the third-class petty officers of the militia with their divisions for two reasons. First, to cut their eye-teeth before going to the Fleet: their work with the latter, in this event, will be vastly better understood. Second, so that there may be some one with the division who is familiar with each man, and can suggest suitable men for details. Also, they can give the instructors an idea as to what ground has been covered already by the instruction on shore, and what is most needed.

To review the system of cruising suggested above, we find the seaman making his first federal cruises with his own friends, and with men who are as inexperienced as he is. He is under experienced petty officers, and gets a fair idea of how a part of the ship is run, and what his individual duties are. When he gets rated, he makes a cruise under the same conditions, which are now fairly familiar to him, and under skilful supervision. He next goes as a second, and later on as a first-class petty officer to a vessel of the Fleet, and performs a seaman's duties. He now gets a chance to see how duty should be performed among trained men, and has a chance to compare militia methods and conditions with those of the navy. While he is learning these things, he is not distracted by trying to teach some one else. In time he gets his commission. At first, of course, the work is strange. As a junior officer he cruises with his own organization, under officers familiar with the work and with the ship, and with nothing to do but to instruct him. He

next goes to the Fleet where he sees a ship run by men who make a business of this work, and he has a chance to try his own hand at it, under their guidance. He gets a taste of maneuvers, signals, honors, etc., for the first time outside the book and lecture room. After a few years of this his education should be broad enough to enable him to put into practice, as head of a department, what he has absorbed. During this whole evolution, he has constantly been under the instruction of people who knew the game, and he has never been diverted from the main channel, which was *his own* education. All this time, his knowledge and experience have been broadened and matured by intelligent instruction, under carefully selected inspector-instructors, in so much of the theory of the game as he may need for the performance of his particular job *and no more*. This has been driven home by repeated cruising on the vessel loaned to his organization.

Obviously no one person can formulate a complete plan for the instruction and employment of the naval militia that will suit all conditions. The above notes, however, are the result of much thought and study, and of some experience. They are submitted with a full appreciation of their imperfection, but with the hope that they may at least serve as a point of departure, by arousing discussion, adverse as well as favorable. Probably everyone who reads them will find something to disapprove in the suggestions made; some will find nothing of which to approve. As to such parts as may be favorably received, I have no doubt but that the reader will say he knew that already, and the rest will be called rot; but no matter. The subject is too important to remain quiescent any longer, and can be advanced only by careful thought and free discussion. I realize that at first glance some of the ideas presented above may seem revolutionary, particularly those in regard to target practice, astronomical navigation, and the federal cruises, but evolution is frequently preceded by revolution. I have discussed every important point in this paper with naval officers and with militiamen, many of whom have served in the navy, and while there was disagreement as to details, there was a remarkable agreement on all the salient issues.

It is a fact that the navy to-day is deplorably short of officers and men. It is a fact that we must depend on some sort of reserve to fill these vacancies (we will never keep on a war footing in time of peace). It is a fact that the naval militia is the only real,

organized, reserve for the navy in existence to-day, and we must take it, for better or for worse. If it is no better than it is, the navy has itself largely to blame. The need for an estimate of the situation and a militia doctrine has been felt. If these notes can serve to dispel some of the fog which has clouded the situation, by arousing interest in this most important branch of the Service, they will have served their purpose, and are submitted for what they are worth.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

THE COST OF BUILDING A BATTLESHIP IN A NAVY-YARD

By Rear Admiral Albert Gleaves, U. S. Navy

It is frequently stated that it costs more to build a battleship in a government yard than in a private one. This is true in a degree; it does cost something more for reasons that will be explained further on, and this notwithstanding that the government pays no taxes, makes no allowances for depreciation, pays no interest on the capital invested (*i. e.*, appropriations) and has no indemnity nor insurance cost. Moreover, as the clerical and drafting forces and other classified employees are paid from the appropriations designated in their appointments, their pay does not constitute a proper charge against new construction, nor likewise does the pay of the naval officers on duty in the yard. In this particular the government has the advantage of a private yard which has an overhead expense not only in the pay of the classified employees, but also in that of the officers of the company.

The charge has been made in some portions of the press and elsewhere that navy-yard figures are juggled, that estimates are purposely made low, with a view to asking later on for an additional appropriation and that work is thus obtained for a government yard to the permanent injury of private concerns and the deprivation of hundreds of skilled workmen in various parts of the country.

There are probably no more conscientious estimators in the country than those who habitually estimate on the cost of work in the navy-yards, and it is certainly not the purpose of this article

to discuss this argument of those opposed to government-built ships. Rather the endeavor will be made to show:

First: Why navy-yard work costs *anything* more in view of the above-mentioned exemptions, and

Second: That the difference is not excessive, and that therefore it is not an extravagance to build ships in navy-yards nor,

Third: An offence against preparedness which demands not only economy but promptness in securing results.

It will first be necessary to describe in some detail the methods of cost accounting used at the navy-yards and authorized by the regulations established by the Navy Department. The cost to manufacture any article in the navy-yard be it a piston-rod or a ship, is made up of three factors, viz.:

(1) The direct labor;

(2) Material; and also what is known as

(3) Indirect, or overhead, charges.

It is the determination of this vexing third factor, the indirect, that has caused so much discussion and has given the accounting experts no end of trouble.

In brief, the indirect charges are composed of charges for services of a general nature, whether labor or material, which cannot be located directly to a job order, such as wages of engineers, firemen, etc.; fuel, power, oil, waste, etc. Now, outside firms have overhead charges as well as the government factories, but whether they are estimated in the same manner or not, I do not know. In my opinion, the proper overhead charges for the construction of a ship should exclude every item not directly and intimately connected with the construction. In other words, no item should be charged in any way to the construction of the ship that would exist if the ship were not being built.

The indirect expense is divided into three separate classes, viz.:

(*a*) The direct shop expense;

(*b*) The power expense; and

(*c*) The general expense.

In the first is included the cost of operating each shop, and is located daily between labor and material under certain definite accounts.

The power expense is, as its name implies, the cost of operating the central power plant, and is located daily between labor and material under separate accounts. The charges to the general

expense show the various miscellaneous expenses which cannot be placed against a specific shop or the central power plant, and are located daily between labor and material under accounts of its own. It will thus be seen that it is possible to make the ship under construction bear a proportion of almost every expense incurred by the yard, because, as a logical sequence, there is practically no expense in the yard that cannot be connected up, by a simple process of reasoning, to the construction of a ship. A new roof, a new building, cleaning shop windows, repairs to a garden hose—all of these impose a certain tax, small or great, on the innocent ship in the cradles, and so it happens that items that are as far removed from the building of a ship as Dan from Beersheba, are linked up with it and are dragged in under the third factor, general expense. The regulations allow any repairs in the shops which cost less than twenty-five dollars, to be charged to the general expense account, so that repairs to a floor in a stable loft, the painting of a fire plug, etc., thus assist to lay a burden of cost upon a ship. It is to exclude such unnecessary and unjustifiable items of expense that the Secretary of the Navy appointed a board to suggest a revision of the system of accounting, so that a just determination of the actual cost of the ship might be obtained. It is evident then that the apparent cost of a ship is not its actual cost.

It is not true, however, as is often stated, that any part of the cost of a new building, or the cost of a crane, and similar constructions, are in any way charged to the construction of a ship. This has been incorrectly stated to be the case. For instance, if a new building were to be erected in a navy-yard, it would be paid for out of a special appropriation. When a crane was erected, for example, at the New York Navy-Yard, 1906, its cost, $70,000.00, came out of a special appropriation which was made for the development of the government yards in which battleships appropriated for that year would be built.

There is another very large expense which is frequently, but improperly, reported as being charged against the cost of the ship. This is what is known as leave, holiday and disability pay, three huge items of expense that outside firms do not have. These are charged directly to the main appropriations, and *do not* appear in the cost of the work. The law allows every employee in the government service 15 days leave and 15 days sick-leave with pay.

It also allows him pay for all national holidays, which up to date amount to six; and furthermore, 13 half-holidays during the summer months. The disability pay is a generous grant which Congress has wisely allowed to men injured temporarily or permanently in the line of duty. As a matter of interest, and as an illustration to indicate the amount of this holiday pay, the amount of holiday pay charged to the "Increase of the Navy" appropriation on account of labor for battleship No. 39 on May 30, 1914, at the New York Navy-Yard, amounted to over $3,200.75, which was one-third of the total amount of holiday pay distributed for Decoration Day. This shows very well the way in which a ship is sometimes said to be charged with something that it is not responsible for. In the course of the three years' building of the *New York*, the indirect charge for leave, holiday and disability, amounted to $363,288.17, and the pay of the classified (clerks and draftsmen) to $316,000.00.

There is another reason why it costs more to build a ship in a navy-yard than outside, aside from reasons due to methods of accounting. A navy-yard is handicapped by the provision in Civil Service Regulations which forbids a man to do work of a higher grade than his rating warrants. A machinist's helper, for instance, at $1.28 per day, may be perfectly capable of doing the work of a machinist, at $3.04 per day, but the yard is prohibited from so employing him. It is clear that this restriction greatly increases the cost of work.

It is obvious that the greater the difference in actual cost between a navy-yard-built ship and a private-built ship, the less likelihood there is of the navy-yard getting the work. It is also clear that the ship-building interests do not favor the policy of the Navy Department in increasing the ship-building facilities in all the yards. The question was under discussion in Congress last year, and the following is quoted from the *Congressional Record* of May 29, 1914:

MR. O'GORMAN: There are interests in this country which look with disfavor upon the building of battleships in our own navy-yards. It is sometimes stated that it costs more to build a battleship in our own yards than in private yards. I heard it stated in the Naval Committee but a day or two ago by the distinguished chairman of the committee, in the presence of all the members, that there was a time, not many years back, when the private shipbuilding interests of the country had sufficient influence with respect to legislation and with respect to the conduct of public departments to make

it appear, by a fictitious and erroneous system of bookkeeping, that a ship built in a government yard was far more expensive to the government than a ship built in a private yard.

MR. HUGHES: A determined effort was made to discredit government construction of battleships. That effort was met by men just as determined that we should not return to the old system under which private manufacturers held the whip hand over the government, and dictated the prices at which battleships should be constructed and the time of delivery. Whether a ship costs more constructed in a government yard than in a private yard is a matter of very little consequence to anybody who knows the facts and has an idea of the real difference between the cost of a ship constructed in a private yard and the cost of a ship constructed in a government yard. The cost does not make very much difference, because it is relatively small; but we do gain in the fact that we compel the private manufacturers to construct our ships for a great deal less, comparatively, than they constructed them years ago; and we compel them to deliver the ships to us in the same length of time in which they are required to deliver them by other nations for whom they construct battleships. So far as I am concerned, I do not look with favor upon an abandonment of that policy for a single moment.

MR. LA FOLLETTE: I am in favor of building this battleship, if it is to be built at all, in a government navy-yard. I am certain, if built in a government yard, it will be better built than if built in any private navy-yard; and I am certain, Mr. President, if the government navy-yard is given an even chance with the private navy-yard, it will be built cheaper in the government navy-yard.

In comparing the cost of a private-built ship and government-built ship, it is necessary to note that, while information concerning the cost of the latter is public property, the *actual* cost to a private firm is unknown, only the *contract* price is known. If the firm in question has built at a loss, the fact is not apt to be divulged. Perhaps a private plant would be willing to suffer a loss, to gain the prestige of building a battleship and the advertising it affords. At all events, when we are told that the *Connecticut* (Brooklyn Navy-Yard) cost $374,000.00 more than her sister ship, the *Louisiana* (private) and that the *Florida* likewise cost $269,000.00 more than the *Utah,* it would be more accurate and more just to say that they cost that much more " than the *contract price* of the *Louisiana* and *Utah.*"

We know, for instance, that the *contract price* of the *Texas,* built by the Newport News Shipbuilding Company, was $5,830,000.00 (hull and machinery) because it is so published in the *Green Book* issued by the Bureau of Construction and Repair,

Navy Department, but we do not know what was the actual cost of the ship to the company. The limit of the cost of the *New York*, by act of Congress, was fixed at $6,400,000.00, and the actual cost of the ship was only $6,135,168.35, or nearly $265,000.00 less than the estimates, this amount being the cost of the material, direct labor, and the indirect *on the direct labor and material.*

The overhead for leave, holiday, and disability amounted to $363,288.17, and the pay of the classified forces was estimated at $316,000.00, a total of over a half million, but, fortunately, this amount, as stated above, is charged to other appropriations and is not charged against the ship. But if this were permissible, then to be logical it would be necessary to include also the pay of naval officers connected with the construction of the ships, in the same way, which would further largely increase the apparent cost of the vessel.

The cost of the *New York* to the government is as follows:

Material Direct labor	$5,272,955.25
Indirect	862,213.10
Actual cost of New York	$6,135,168.35
Contract price of Texas	5,830,000.00
Excess over *contract price* of Texas	$ 305,168.35

The keel of the *Texas* was laid April 17, 1911; the keel of the *New York* was laid September 11, 1911.

The *Texas* was launched May 18, 1912; commissioned March 12, 1914. The *New York* was launched October 30, 1912; commissioned April 15, 1914.

While the interval between laying the keel and launching the battleships was practically the same (13 months) the *New York* was finished in five and one-half months less time. Moreover, ten days after the commissioning of the *New York* she went to sea fully armed and equipped and ready for any service, an unprecedented record, beating the corresponding time of the *Texas* by two months and three days.

The difference in cost of repairs to ships after going into service is not a fair criterion of efficiency of the construction, nor does it make a fair comparison, unless the ships compared have had identical service and identical alterations. In the case of the

Connecticut and *Louisiana*, where the service has been the same, the balance is in favor of the government-built ship:

	Connecticut	Louisiana
1st year	$ 236.97	$ 5,851.09
2d year	53,557.94	99,851.09
3d year	111,833.00	149,167.00
	$165,627.91	$254,869.18

Comparison, however, between the *Florida* (Brooklyn Navy-Yard) and *Utah* (New York Shipbuilding Company) shows the balance the other way, but the difference in both cases is not excessive, and shows the worthlessness of any argument for or against government-built ships based on such a comparison:

	Utah	Florida
1st year (after date of commissioning)	$14,017.74	$ 5,304.89
2d year	59,962.45	25,322.10
3d year	14,705.34	104,170.69
	$88,685.53	$134,797.68

Difference in favor of private-built ship: $46,112.15.

From the above it will be seen that the final balance is in favor of the government-built ships by $43,129.12. However, the differences are not excessive, and for practical purposes, the result of such comparisons is as indefinite as the conclusion to be drawn from the fable of *Les Trois Anneaux*.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

TERRITORIAL WATERS

By LIEUT. COMMANDER H. G. SPARROW, U. S. Navy

In discussing naval phases of the European War, together with possible and probable operations in various waters, the writer found that his lack of precise knowledge of the political status of different bodies of water other than the high seas was widely shared.

A search for information on this score brought forth many interesting facts relating to the history of some of the waters and to the growth of definite customs regarding them. The present paper is compiled from notes taken in the course of the search referred to.

The following authorities were consulted:

Moore, International Law Digest, Washington, 1906.

Oppenheim, International Law, London, 1912.

Stockton, Outlines of International Law, Scribner's, 1914.

Latour, La Mer Territoriale, Paris, 1889.

Encyclopædia Britannica, 11th Edition.

References to the source of information for each fact stated below are not given for the reason that the important facts are quoted by virtually all the authorities consulted and the references would thus become very cumbersome.

A state is defined as an organized group of individuals permanently occupying and controlling a fixed territory. If the state is sovereign it has entire control over such territory in both its internal and external relations. If it is not sovereign its status is usually well defined, so that there exists no doubt as to jurisdiction over the territory, except in occasional instances of boundary disputes.

So much for jurisdiction over the territory or land of the earth. There remains to be considered, however, the much greater area of the earth covered by water.

By the very nature of things a state must have control over any bodies of water which are entirely within its territory and surrounded by it, for, to obtain access to such water, a foreign state would be compelled to trespass upon the territory of the state in question. Nor could such trespass be avoided, even by traveling through the air, for the tendency of modern states is to claim as territorial the air above their dominions to an unbounded height.

But far the greater surface of water on the earth is not wholly confined within the limits of one state, but either borders on territory unequivocally under foreign sovereignty, discharges into such territory, or borders upon the open sea. Aside from such waters are the high seas themselves.

So it has become necessary, for the purposes of amicable coexistence and intercourse of states, to have clearly defined, either by general rules, or by specific sanction, the rights and restrictions of all parties concerned in the use of all waters.

SEAS OR OCEANS

Beginning with the largest divisions of water, the seas or oceans, we find that in antiquity, to the limited extent that the seas were known and used, they were free. No weight is given the contending claim of the Roman Emperor Antoninus Pius "Being the emperor of the world, I am consequently the law of the sea."

But, as we get to the later Middle Ages, we find states making exclusive claims to certain seas, enforcing these claims, and having them recognized by other states. This was the doctrine of *Mare Clausum*. As examples we may quote the request of the Emperor Frederick III of Germany upon Venice, in 1478, for permission to transport corn through the Adriatic; also the practice of England in forcing all foreigners to take out an English license to fish in the North Sea.

To a state of society tolerating such principles as these, the liberal principles proposed by Grotius, the "father of International Law," in his treatise *Mare Liberum*, published in 1609, appeared heretical and aroused protest.

But the germ was planted, the idea grew and, by the end of the first quarter of the 19th century, the doctrine of the freedom of the open sea had universal acceptance.

Just recently, however (July, 1915), Italy has declared the Adriatic Sea closed to navigation of all countries north of a line joining Otranto and a point on the opposite shore. This, of course, has been done as a belligerent act, wherein it differs from the former exercise of such authority as a simple sovereign act, irrespective of war rights or powers.

The London press in December, 1915, discussed a proposal that the Allies should close the Mediterranean and permit trading therein by license only.

These acts, or proposed acts, do indeed contravene the liberal ideas which had slowly gained control, but in a struggle of the magnitude of the present war, wherein, too, all the great maritime nations are belligerents, it is hardly to be wondered at, though deeply regretted, that some conventions should be overridden when one belligerent or another believes it to be of advantage to take such action.

Having noted these exceptions to established custom, we return to a consideration of the growth of this custom.

England long laid claim to the "Narrow Seas," or "King's Chambers," composed of St. George's Channel, the Bristol Channel, the Irish Sea and the North Channel. As late as 1805 the regulations for the government of the British Navy required every commander afloat to see to it that all foreign ships "within His Majesty's Seas (which extend to Cape Finisterre)" should strike their topsails in acknowledgment of Britain's sovereignty therein. In the Territorial Waters Jurisdiction Act of 1878, though, no such claim was made, and it may be considered to have been quietly dropped, along with all other such claims.

Thus we see that the seas themselves have come to be free and open to all alike; but all seas border on the territory of one or more states. Was the doctrine of freedom of the seas to extend to the very shores of such states?

Maritime Belt.—The answer given by the states themselves is "No." They have been a unit in declaring for a fictitious extension of territory which has come to be called the "maritime belt," also frequently referred to as the "Marine League."

Justification for this is found, first, in the fact that the security of the bordering state demands exclusive possession; second, in the need for surveillance of shipping, for guaranty of good policing, and securing political and fiscal interests (customs dues, etc.); third, in the necessity for assuring the existence of the population along the coast (coast-fisheries).

Writers, though, draw a distinction between the sovereignty over the land territory and over the maritime belt. The state exercises territorial supremacy in her continental domain but only what we might call a primacy of interest in the maritime belt. To illustrate the difference, a state permits to foreign vessels the right of innocent passage in the maritime belt, but does not concede this privilege on its national rivers.

Some writers, too, draw a further distinction between those rights in the maritime belt which a state may or may not, by its sovereignty, reserve to itself, according as they are exhaustible or inexhaustible. Thus the ability to pass through waters is inexhaustible, while the fisheries of the same are not. Hence the state may keep for itself the fisheries of such waters, but not the right of passage.

However, the right which each member of the family of nations has to intercourse with the other members would in itself give the right to innocent passage through such waters.

Extent of Maritime Belt.—Granted that states are entitled to a maritime belt about their territory, it becomes necessary to fix the extent of such belt, *i. e.*, its inner and outer limits.

The Romans, in cases where it became necessary to measure distances from the shore line, began at the high water-mark, but latter-day treaties recognize the low water-mark as the one from which the maritime belt is measured. In this, as in so many other phases of international law, various proposals have been made by writers, such as beginning the belt at the line of navigable depth, but practice has become general in choosing the limit given above.

The inner line of the maritime belt follows the sinuosities of the coast-line. Its location at the mouths of bays and rivers will be treated below.

What the width of the belt should be has been a vexed question. In the Middle Ages, when protection against pirates was one of the strongest reasons for the existence of the belt, 60 marine miles was often claimed, and is so recorded by the writers of the times. We

have record, too, of Spain's exercising her authority over such area.

Bynkershoek, in 1702, first proposed that, as the purpose of the maritime belt was to afford security to the coast, it should extend only so far as the sea could be defended from the coast, *i. e.*, to the limit of cannon range.

There have been treaties which embodied this definition, notably that of 1799 between Great Britain and the United States, and this principle is favored by Germany at the present time.

Following the first enunciation of the principle of cannon range, the actual distance represented increased with improvement of ordnance, but a need was later felt for a more exact definition, and so we find many states embodying in treaties a distance which, at the time the treaties were made, represented about the extreme range of cannon shot, three miles. So general did this rule become that it has continued down to the present time, and has wellnigh universal recognition. Certain exceptions to be noted are Norway, which claims that the configuration of her coast necessitates her exercising jurisdiction over a belt four miles wide, and Spain, which claims six miles.

The mile, used as unit of measurement, is generally stipulated in treaties as being the one-sixtieth part of a degree of latitude.

In passing, as a matter of interest, we may note the statement of one of our early statesmen, President Jefferson, that the United States should lay claim to jurisdiction to the inner edge of the Gulf Stream.

The Institute of International Law, at its sessions in 1894, adopted certain rules regarding territorial waters which Holland, in 1896, brought to the attention of European and American governments for conference thereon, but no further action was taken.

These rules proposed that territorial waters should extend six marine miles from the low water-mark, following the sinuosities of the coast, except that in the case of bays more than 12 miles wide, the belt is to be measured from a straight line from shore to shore at the points where the bays contract to 12 miles.

For greater security of states, and considering, too, the increase in draft of ships, it seems advisable that the limit should be extended to six miles, but the three mile principle is so well established that it seems little likely to be changed.

In this connection it is interesting to recall that, in the case of the fight between the *Kearsarge* and the *Alabama,* off the French coast, the French government demanded that the action be held at such distance from the shore that shells would not drop in territorial waters of France.

Jurisdiction over Maritime Belt.—Although writers differ on the question, it seems good practice to affirm that no state has the right to deny innocent passage through her territorial belt to foreign merchantmen, subject, of course, to the rights of belligerents. This, however, does not include the right of cabotage or coastwise trade. Such innocent passage cannot be claimed by men-of-war unless the territorial waters form part of the highway between open seas, but is usually not denied them.

The question as to the extent of jurisdiction of a bordering state over foreign merchantmen passing through the waters is a moot one. In the celebrated case of the *Franconia,* in 1876, the British Court for Crown Cases Reserved held that English courts had no jurisdiction over crimes committed in the English territorial belt. Parliament, in 1878, passed the "Territorial Waters Jurisdiction Act" to remedy the situation. By this bill it was declared that an infraction committed by an individual, whether or not a subject of great Britain, within the territorial waters of His Britannic Majesty, came within the jurisdiction of the Admiralty courts, even though the offense were committed on board a foreign vessel. Another article of the bill declares, however, that action in such cases shall not be taken, except with the consent of one of the principal Secretaries of State of His Majesty. This would indicate that the right is not held to be so free from question as to warrant its unrestricted enforcement.

The Institute of International Law has adopted the rule that crimes or offenses committed aboard a foreign ship passing through territorial waters are outside the jurisdiction of the bordering state unless such crimes affect the state's rights.

This accords with the view taken by the United States Supreme Court, in the case of Church *vs.* Hubbart, that nations may prevent violations of their laws by seizures on the high seas in the neighborhood of their coasts, but the seizure must be justifiable under the laws of the country exercising that right.

ENCLOSED SEAS AND INTERIOR SEAS

Inland waters serving as means of access to the ports of one state are considered, in general, to be territorial.

The seas of Azov and Kara are considered territorial by Russia, and seemingly with good ground.

In the case of the Inland Sea of Japan, the British Supreme Court at Shanghai declared this to be the high seas. The Privy Council, on appeal, reversed the lower court's decision in the case, but made no comment on the question of the Inland Sea's being part of the high seas. Japan treats it, however, as territorial waters, and, in view of the narrowness of the openings to it, it is hard to see how it could be otherwise regarded.

The Black Sea has had an interesting history. Until the eighteenth century it was bordered by Turkish territory only, and under such conditions was treated as a closed sea by Turkey. With the advent of Russia upon its shores it ceased to be a closed sea and foreign merchant shipping was admitted; later, by the treaty of Paris, 1856, it was opened to commerce of all nations and neutralized. The flag of war was forbidden, except in the case of a few small Russian and Turkish vessels maintained for police purposes.

In 1870 Russia disregarded the stipulation prohibiting men-of-war, and, by the treaty of London, 1871, the requirement of neutralization and exclusion of men-of-war were abolished.

The Baltic Sea was virtually closed by Denmark's control over the sound from early times down to 1857, but by treaties in that year the sound and sea were declared open. No special declaration as to the Baltic's condition in time of war has been made, but in treaties between Russia and Sweden, in 1759, between Russia and Denmark, in 1780, between Russia and Prussia, in 1781, and between Denmark and Sweden, in 1794, the Baltic was declared neutral. Some writers uphold the right of the bordering countries to declare the Baltic closed, but this has not been done in any recent war.

In the case of interior seas, which term includes lakes, the custom has been to divide their waters proportionally among the bordering states. Thus the Caspian is Russian and Persian, although, as by treaty Russia alone can keep armed vessels thereon, the sea is virtually Russian.

The Great Lakes of North America, with the exception of Lake Michigan, are considered entirely territorial waters divided between Great Britain and the United States by a line midway between their shores. Lake Michigan belongs entirely to the United States.

GULFS AND BAYS

It is generally admitted that gulfs and bays enclosed by one state, whose entrance from the sea can be commanded by coast batteries, belong to the enclosing state, even if the entrance is more than six miles wide; whereas bays whose entrance cannot be commanded by batteries, also those enclosed by more than one state, must be considered part of the open sea.

In practice, though, there are certain exceptions. Great Britain has always claimed Conception Bay as territorial, and the United States has claimed Chesapeake Bay and Delaware Bay similarly.

As stated above, the Institute of International Law has recommended that bays be considered territorial only where less than 12 miles, though exempting from this provision those wider bays which have been considered territorial for more than 100 years.

Various fishery conventions concerning the North Sea made by the bordering states stipulate that exclusive jurisdictions may be exercised in bays up to 10 miles in width.

In the award of the Hague tribunal, in 1910, concerning North Atlantic coast fisheries, it was decided that the marine league should be measured at right angles from a straight line across the body of water at the place where it ceases to have the configuration and characteristics of a bay.

In the case of a foreign fishing vessel violating British fishing laws in the Moray Firth, but more than three miles from shore, the British government recognized the Firth as not being a British territorial bay.

As Oppenheim well says, the whole matter calls for an international conference to settle what gulfs and bays are to be considered territorial.

STRAITS

We may divide straits into two general classes, the first, those leading to inland or territorial seas and the second class those connecting open seas. As regards the first class, if the strait is

narrow enough to be commanded by coast batteries, there can be no question of the territoriality of the waters. The second class of straits is that which raises questions of jurisdiction. In this case the bordering state has the same rights as in the case of coast waters. It has jurisdiction if the strait is not over six miles wide, but cannot deny the right of innocent passage to merchantmen nor to men-of-war. Again we must note that, whereas the governing principle is as just stated, certain straits are, by agreement, excepted therefrom.

In 1894 the Institute of International Law adopted the following principles relative to straits:

1. Straits whose shores belong to different states form part of the territorial waters of the bordering states, who have sovereignty to the middle limit.

2. Straits whose shores belong to one state form, so far as concerns approach to the coast, part of the territorial waters of such state, although they may be indispensable as means of maritime communication between two or more states.

3. Straits which serve as passage from one free sea to another can never be closed. Straits actually subject to conventions or special usages are exempted from these rules.

The Sound.—From as early as the fourteenth century, Denmark claimed jurisdiction over the sound and the two belts leading to the Baltic and collected tolls on all ships passing, in return for which she guaranteed freedom from piracy and maintained aids to navigation and pilots.

In 1848 the United States protested against this practice, declaring that, under the public law of nations, navigation of the two seas connected was free to all nations, therefore navigation of the sound connecting them should also be free.

After several years of negotiations, Denmark, in 1857, concluded a treaty with the principal European maritime nations whereby, in return for indemnities paid her, Denmark gave up her claims to tolls. In the same year a treaty between Denmark and the United states to the same effect was concluded.

Dardanelles and Bosphorus.—Until the eighteenth century, Turkey surrounded the Black Sea and her exclusion of all foreign shipping therefrom was allowed. After Russia became a bordering state, however, Turkey was obliged to permit passage of foreign merchant shipping through the Dardanelles and Bos-

phorus, but she continued to exclude foreign men-of-war. By various treaties this action was confirmed, and by the treaty of Paris, 1856, the Black Sea was neutralized and opened to merchant shipping of all nations, but forbidden to the flag of war, except certain small Turkish and Russian patrol vessels. By separate convention the rule excluding foreign men-of-war from the Dardanelles and Bosphorus was reaffirmed.

In 1870 Russia disregarded the neutralization of the Black Sea, and in the treaty of London, 1871, this neutralization and exclusion of men-of-war therefrom were abolished.

In 1902 Turkey permitted Russia to pass four torpedo-boat destroyers through the Bosporus and Dardanelles, but disarmed under merchant flag. Great Britain protested against this and reserved the same right for herself.

Again, in the Russo-Japanese war two vessels of the Russian volunteer fleet passed through the straits under merchant flag, later hoisting the man-of-war flag and undertaking offensive operations in the Red Sea. No nation protested to Turkey against this passage, as, of course, it was not possible for Turkey to foresee the use to which these ships would be put.

Straits of Juan de Fuca.—By treaty of 1846 the boundary between the United States and Canada follows the middle of the channel between Vancouver Island and the mainland from the 49th parallel of latitude through the strait to the sea. The whole strait is open to the use of both countries, but both have considered the waters as entirely territorial.

Straits of Magellan.—In 1879 the United States Secretary of State declared that this country would not tolerate exclusive claims by any nation whatsoever to the straits of Magellan. A treaty between Argentina and Chile, made in 1881, neutralized the straits, guaranteed free navigation to all nations and forbade fortifications thereon. This put an end to all disputes as to the straits.

RIVERS

If a river lies wholly within a state, it is, like interior seas and lakes, wholly under the jurisdiction of that state and not open to foreign states, except by grant of that privilege. Canada, in 1876, and again in 1892, agitated the question of the right of Canadian vessels to use the Hudson River as far as New York, as contingent

upon their right to use the Champlain Canal to Albany. The United States replied that the Hudson lies wholly within the United States and is not an international river.

By treaty between the United States and Great Britain, in 1790, the use of the Mississippi River was reserved to subjects of Great Britain and the citizens of the United States forever, but this was done under the misapprehension that the river had its source in Canada. In 1818, when another treaty between the United States and Great Britain was negotiated, the United States Commissioners refused to agree to a similar provision, as it was then known that the Mississippi River lies wholly within the United States.

Rivers which form boundaries between states are under the jurisdiction of such bordering states, the dividing line usually being the middle of the navigable channel, unless otherwise stipulated.

Rivers which flow through two or more states come under the jurisdiction of each in its own territory, but no state has the right to take any action on its part of such river as will affect adversely the enjoyment by another state of its rights in the same river.

Until the French Revolution, bordering states on international rivers had, and sometimes exercised, the right of excluding navigation of such rivers in their territory by ships of foreign states which bordered on the same river.

The Congress of Vienna, though, in 1815, recognized the principle of the right of free navigation between the sea and head of navigation on international rivers, not only by the bordering states but by all states.

The treaty of Paris, 1856, opened the Danube to free navigation, and the Congo Conference at Berlin, 1885, did the same for the Congo and Niger rivers and their tributaries.

This free navigation refers, of course, to commercial shipping only. We have very recently, in the present war, seen the refusal of Rumania to allow men-of-war of either Austria or Russia to use the Danube in Rumanian territory.

The recognition of this principle of free navigation on international rivers has not been universal, however, as the United States for many years was not granted by Great Britain the free use of the St. Lawrence from the international boundary to the sea. In 1854,

by treaty, Great Britain granted this privilege, reserving the right to suspend it, but by the treaty of Washington, 1871, navigation of the river was declared free and open forever for purposes of commerce to citizens of the United States, subject to all laws and regulations of Great Britain and Canada not inconsistent therewith. This does not, however, grant the right of passage of United States men-of-war.

The rivers Yukon, Porcupine, Strikine and St. John (where it forms the international boundary) by treaty with Great Britain are governed by the same principles as the St. Lawrence; by treaties with Mexico, in 1848 and 1853, rights in the Colorado river, Gulf of California and Rio Grande are similarly secured.

By proclamation of Argentina and by treaties between the United States and Paraguay, the Plata, Parana, Paraguay and Uruguay rivers are open to free navigation.

Amazon.—The right of the United States to navigate this river formed the subject of much diplomatic negotiation from 1850 on, and finally, in 1866, the Government of Brazil declared the river open to vessels of all nations; Bolivia had previously made a similar decree, regarding headwaters or tributaries to the Amazon, and Peru later did likewise.

Brazil, however, requires the securing of a permit as a condition for foreign men-of-war ascending the river. The U. S. S. *Wilmington,* in 1899, made this trip.

Orinoco.—Venezuela permits the use of one channel in this river, but has closed the other by decree. The United States protested against this closure, but Venezuela refused to rescind her decree.

CANALS

Canals being artificially constructed, there can be no question of the complete jurisdiction over them by the state in whose territory they lie, save where modified by treaty stipulations.

In general states have been more liberal to foreign states in grants of privileges in canals than in rivers, but this cannot be considered a purely philanthropic action, as the question of revenue from tolls has an important bearing.

The Kiel canal in Germany and the Corinth canal in Greece are each controlled by the bordering state and have been opened to all merchantmen.

It is interesting to note here that the construction of the Kiel Canal gave rise to agitation in France over the construction of a canal to join the Atlantic and Mediterranean, passing through southern France. It was argued that the Kiel Canal doubled the value of Germany's fleet, and further that the control of the Straits of Gibralter by England might operate to cut off the two coasts of France from each other. A study of the project by government officials was made, but the difficulties were considered too great and the project was dropped.

Suez Canal.—This was built by a so-called Universal company formed by De Lesseps under a firman, or concession, issued by the viceroy of Egypt, a vassal state of Turkey. The firman granted a 99-year concession, at the end of which time the canal was to revert to the Egyptian Government.

Without going into details regarding the history of its construction and the negotiations concerning its status, it will suffice to state that, by the convention of Constantinople, 1888, the canal was declared to be open in peace and in war to the merchantmen and men-of-war of all nations. It cannot be blockaded, nor is any act of hostility allowed within it nor within the three-mile limit of either of its terminal ports.

Men-of-war of belligerent nations must pass through without delay; troops, munitions and other war material may not be loaded or unloaded within the canal or its harbors; no men-of-war may be stationed in it, nor any permanent fortifications erected.

During the Franco-Prussian war ships of both belligerents used the canal.

At the time that Great Britain proposed the treaty draft which later became the Constantinople Convention, she declared that, in respect to the free passage of the canal, she reserved the right to take such action as might be deemed necessary by her, while her troops remained in Egypt. This reservation was referred to again in the British Parliament in 1898.

In 1898, during the war with Spain, the United States inquired of England, as the controlling power of the canal, whether the United States, a non-signatory power to the Constantinople convention, was on the same footing as regards free passage of men-of-war as the signatory powers. The reply was affirmative.

As Egypt virtually forms to-day a protectorate of Great Britain the canal may be considered, for practical purposes, to be in British territory. It is at all events controlled by the British. Of the 400,000 shares of the canal company's stock, 177,624 were assigned to the Khedive of Egypt. These shares, less 1040, of which the Khedive had already disposed, were bought from him by the British Government in 1875.

Whether the close of the present war will see any change in the conventions regulating the use of the canal is problematical. It forms a vital link in the path to Great Britain's possessions and is not likely to be overlooked in any international agreements that are made.

Panama Canal.—This is constructed in United States territory and is wholly under the jurisdiction of the United States. By the Hay-Pauncefote treaty of 1901, between the United States and Great Britain, the canal is declared open and free to merchantmen and men-of-war of all nations on terms of entire equality. It is never to be blockaded nor any act of hostility to be committed within it. Belligerent men-of-war are forbidden to revictual, take on stores or stop within it. In fact the treaty declares that the principles of the Constantinople Convention of 1888 are accepted as applying to the Panama Canal.

No provision was made for the adherence of any other state to the treaty, nor is there any reference to defenses, though it was understood that the United States reserved the right to take such measures in this respect as it saw fit, and the canal is actually being fortified.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

BUILDING PROGRAMS AND NAVAL BASES

By Major Henry C. Davis, U. S. M. C.

We are informed by the daily papers, that the present administration will ask Congress to inaugurate a building program for the navy by which the matériel strength of the fleet will be doubled in five years.

There is a feature, however, connected with any building scheme, which it appears has been more or less neglected in the past, and it is but natural that the auxiliary parts of the navy are apt to be overlooked by those whose conception of a navy is one of a mass of fighting ships and nothing else.

It is hoped that we shall not commit the oversight, and neglect that most important of all auxiliaries to the fleet—efficient bases.

It is not meant to refer to the navy-yards at home as bases, but to those ports in distant waters in which the fleet may have to find all the mass of things required by a fleet in active campaign. Bases must exist for the fleet and not the fleet to provide work for the bases.

There can be no question of the needs of the fleet in regard to personnel and matériel, nor can there be any question but that the needs of the fleet in these respects are known and will be remedied, but experience which, as George Washington said, "Is the best criterion to work by," has so clearly pointed out the fact that we have no definite policy about bases, that it is hoped that those in authority will not let this vital need of the fleet be neglected. A definite program of expansion and progress is as necessary as is the program for the fleet.

Commander Belknap, in his article on the subject of the base at Key West during the Spanish War, points out the great need of having completed organization for the bases before the declaration

of war, and he shows us the confusion under which the base at Key West was administered because the fact of having such a base organization had not been apparent to us before the war.

We know now that such bases are necessary and it is very important to the best service of the fleet that it be provided with bases which have been in running order and under efficient organization during the time when we are preparing for war.

We cannot afford to overlook the very important fact that the proper equipment of a base is a matter of years of labor and foresight and not one which can be done in a month or a year. The engagement of the force to administer the base and to give to the fleet the best service possible is equally a matter of time and experiment and not a thing which we can afford to have done in a haphazard way. There must be smoothly working machinery, in both shops and administrative force, to whom war will mean simply a condition to which all the training of the force has always looked forward.

To accomplish this most desirable end we must begin now and put the equipment, the tools, the docks, the stores and the administrative force in the field, so to speak, and start them along the road they are to follow until they have evolved a system needing the minimum of expansion to assume the duties which are a part of war.

The importance of having docks capable of taking the largest ships must be pointed out, because, in those vast areas where naval war occurs, we cannot tie our ships to our nearer island possessions when the demands of strategy may take them thousands of miles from those docks and repair shops.

The commander-in-chief must feel that his fleet will have facilities at its disposal nearer to his immediate theater of operations than those of such possessions as we own, which may be many, many miles from the scenes of action.

He must not be forced to go into action with his mind worried by the fact that injuries to his ships cannot be repaired in his vicinity, nor must he be forced to go into action knowing that such injuries, if they are to be repaired, will take from him important units of his fleet for longer times than he can spare them.

We know that these things must be foreseen and prepared for and knowing this it is difficult to understand why they have not been given a more important place in the preparation of the bases

which we now hold. Nothing progressive has been done in one of our very important bases in the seventeen years we have had it. Nor is there any assurance that any progressive advancement will be made because of the wide latitude given the chief of that station, and his freedom from any policy laid down, not only for him but for all the chiefs who may be sent to that station.

The reason for this lies in the fact that our attention has been devoted so closely to the actual fleet even at the expense of the things which make that fleet efficient. The need of fighting units has so overshadowed the equal need of auxiliary things for the fighting ships that we have very naturally neglected the less striking requirements for the most pressing ones.

The matter of bases in the possible areas where war is likely to come to us, is of great importance to the efficient conduct of the war and the victorious use of the fleet. The necessity for dry docks capable of taking our largest ships, in the distant bases, is ever present and so great is this need that war might find us totally unprepared in this vital respect unless we start at once to build such docks as we need.

Where great stretches of ocean intervene between a fleet and its home country there must be shops, docks, supplies of all kinds at other points than the home coast if the fleet is to take and keep the sea.

We must clearly point out, to those who do not understand it, the necessity for having our foreign bases prepared for any emergency which may arise. In doing this important work we should try to impress on them the vital necessity of having such programs as we adopt, for the bases in question, progressive and continuous, so that each year the sums allotted will be applied to the things which will go to make the base all that the fleet can desire in time of war.

It is of great importance that we of the navy settle on some definite points for our bases in both the Atlantic and the Pacific oceans, and when that very important point is settled then we may hope that a policy of continuous preparation will be adopted, but when we are divided in our own minds and find ourselves pulling in all directions, we cannot hope for results of any importance.

There does not seem to be much doubt about the willingness of Congress to give us much of what we ask for, but when we face a condition where we don't know ourselves what we want, we are

certainly not just to raise the cry that Congress won't do this or it won't do that.

To accomplish anything, whether it be a building program for ships, whether it be a base establishment and equipment, or whether it be a matter of administration, there must be a definite, clear-cut, closely adhered to policy covering the matter under consideration. We must be organized from top to bottom.

Commander Belknap tells us that three weeks after the Spanish War was declared there was not even an office provided for the base commander at Key West; there was no stationary, no telephones, no messengers, etc., and if a condition of that kind confronted us in our own country three weeks after the declaration of war, how much more difficult it will be to get the proper organization and equipment at a base which may be thousands of miles from our coasts.

The things we should have learned in the war with Spain, which have a bearing on the matter of the bases of the fleet, seem to have been very much neglected. I have been at many so-called bases outside of the United States but at none of them was the force very different from the usual navy-yard force, and in fact the general understanding was that these were navy-yards outside of the home country. They were not, to the best of my knowledge and belief, organized for war, and all of them were seriously under officered, particularly with regard to the staff of the commandants on whose shoulders would fall the mass of work connected with war administration.

At one of our very important bases the commandant performs a multitude of other duties, among them civil offices connected with the so-called civil administration of the place. There is no doubt about the confusion which would result as a war condition because nearly every person at that station would perform new and unusual duties in the event of war.

It can hardly be questioned that the most important duties such a commandant has to perform are those looking to the preparation of his station for war time use, yet I know of places where war is the least thought of the executive officers and the organization is lacking accordingly.

A base commander should be selected as such because of his special training or qualification for such important duty, and the many duties he will have to perform, to perfect the force under him

for war time use, which is the chief mission of the base, will not allow him to delve into other matters except at the expense of his primary work, base establishment and preparation.

To have adequate and proper preparation for war, the bases of the fleet cannot be overlooked or neglected. We know how little that the fleet needs can be obtained from the sea and because of this knowledge we cannot afford to neglect the vital feature of war preparation, placing the bases on a footing which will allow them to provide the repairs, stores, fuel and docking facilities necessary to the well being of the fleet.

Admiral Mahan has very clearly pointed out the essential things for an over-seas base, and he tells us that one of the principle requirements of a base, from a military point of view, is complete and adequate docking facilities. It is the lack of this important military feature which is a characteristic of most of our bases beyond the seas. We should certainly exert efforts to have such a defect remedied as soon as possible.

By no stretch of the imagination can the fleet be thought to be ready for war if the humble and yet very important auxiliaries are not provided for. The trained ship's crew and all that it means is not in its most efficient condition if the matériel of the ship is short or lacking at a critical time. And without proper provision for the auxiliaries, bases, etc., such a condition might arise.

To conduct a fleet across vast bodies of water and have it in effective fighting condition on arrival, or shortly thereafter, requires a place at which it can refuel—a base—and if the base and the facilities for rapid refueling are lacking, the fleet is crippled and badly handicapped. If we do not have all the things needed by the fleet when it arrives in foreign waters we cannot expect to be victorious should an action ensue after our arrival.

If the fleet should not be accompanied by its fuel ships there must be means at the base for rapidly getting the fuel needed to them and there must be protection from the weather as well as from an aggressive enemy.

These are not matters which can be provided in a short time and they are features of campaign which may have great weight in the outcome of the action. It is not fair to the personnel of the fleet to subject them to makeshift methods after war is declared when we can give them all the advantages such preparation means by the use of a little foresight.

The men of the fleet are entitled to at least an even break with the enemy, and they will not have it unless every contingency which human foresight can provide for has been considered and the means to meet it have been worked out.

Many things, not a part of the immediate fighting force, are a part of the efficient fleet, and among these exterior things not the least important are the bases. Much money and much time is needed to put the bases we have in the best condition for the use of the fleet, and if we are to have them ready before a war comes to us we cannot afford to waste any time in starting the preparation of the bases so that they will be prepared to give the best service to the fighting ships.

It is our duty as a nation to look ahead; maybe it will be five, ten, or even a hundred years before we have a war. No matter whether or not it is any one of these periods of time, it is our duty to those who come after us to provide every means of maintaining our national existence; neglect of the fleet or any part of the fleet auxiliaries is not fair to the Americans of the future.

The error so often committed by republics of living in the present and letting the future look out for itself is one we should avoid; neglecting the fleet, or any part of it is committing that fatal error and not avoiding it.

The requirements of bases are varied and many and the study of these requirements cannot be lightly entered into. It is essential to success that all that human foresight can do, be done during peace, and not during war.

Progress in the preparation of the bases requires a policy for them and this policy must be one passing from one chief to another. It must be a policy which takes out of the hands of the person who may be ordered as the base commander or commandant, the power to apply the funds allotted to him as he thinks proper. There has been so great a waste of money because of this power that we have not progressed as we should have done had each of the many men in command of our bases supervised the work laid down for him by a general staff or some similar body of officers.

Not only has this lack of policy been expensive, but it has been at the bottom of the lack of progress we have made at our bases because each succeeding commandant, at many places, has ignored or not approved of the things his predecessor has done and has exercised the authority given him and done what he thought

proper, with the result that we have many bases which are covered with unfinished work representing so much money wasted.

Our national policies in the Pacific make it imperative that we have bases in that ocean other than those on our own coasts and other than those in the island possessions nearest to our home coasts. The principle is admitted that, for the purposes of campaign, an army establishes a base nearer to the theater of war than those which, from their character, may be called permanent bases or depots of supply. In the same way it is essential to a naval campaign to have secondary as well as advanced bases. The advanced bases are themselves based on the secondary bases.

The secondary base requires docks and shops and these we lack at the points most likely to be used as secondary bases. Much discussion has already taken place as to the points at which these secondary bases are to be established and, as Admiral Mahan says, "If the given theater of maritime war be extensive and contain many points susceptible of strategic usefulness, the choice among them becomes important." (Naval Strategy, p. 201.)

Whatever points are selected it must be remembered that these secondary bases will be the points from which the fleet will act to establish advanced bases, and they must be prepared to give the fleet every facility for repair and docking which, of course, could not be had in the advanced base. They must be close enough to the possible advanced base to allow the ships to return to them without taking valuable units from the fighing force for long periods of time.

Admiral Mahan also says about these secondary bases, " . . . . a nation which wishes to assure a share of control on any theater of maritime importance cannot afford to be without a footing on some of the strategic points to be found there. Such points, suitably chosen for their relative positions, form a base; secondary as regards the home country, primary as regards the immediate theater." (Naval Strategy, p. 200.)

It is these secondary bases which at present are of primary importance to our fleet. Their importance lies in the fact that they are the points which will lie closer to possible advanced bases than the other insular bases established.

Whether or not the bases in a vast body of water like the Pacific Ocean may be close enough to agree with the strategic principle of mutual support is a question; it is certain, however, that the

important ones are far enough apart to make an enemy divide his fleet in order to watch both, and we have therefore to decide whether or not the violation of one principle in part, is compensated for by the agreement with the other half of the same principle.

We hold important points in the Pacific, but we have not secured our hold on them all to such an extent as to make the use of them an assured fact to our own fleet in time of war. We have an important duty to perform and to perform at once to so secure those bases that we will not have to inaugurate a campaign to retake from an enemy what we have held for many years but have neglected to fortify and prepare against capture.

Nor must we overlook the fact that our possible enemies have made complete studies of the strategic situations in the oceans which surround us. They will have realized the usefulness of *our* frontier points, not so much to them as to us, and they will have prepared to make us fight for what is already our own unless we at once place our outlying bases in adequate defensive condition.

It is so easy to lose sight of these matters in the excitement and bustle connected with the political action at the capitol when Congress is making appropriations for other necessary things for the fleet, and it is hoped that a bountiful amount may be included in the estimates for the naval expenditures for the purpose of making our secondary bases, bases in fact as well as in name. Whatever amount is so allotted should be expended in carrying out a definite progressive policy for these bases.

There is a consideration which arises in the question of a policy being inaugurated to extend from year to year over any long period of time, and that is the inevitable changes which occur in our governing bodies. It is not the purpose of this paper to discuss how this difficulty is to be overcome, but it is certain that if Congress can provide a means of establishing a building policy to be completed at a future time, they can also establish a policy for our bases which will also be progressive and be completed at a future time.

We should try to avoid the mistake of having all the legislation for the fleet at the expense of the auxiliaries which are of such vital importance to the fleet.

We have owned points of great strategic importance since the Spanish War, but our interest in them seems to have awakened

only very recently. The result is that we have not the well-prepared bases we should have had if we had at once adopted a policy of preparation for these points as bases. We have also been undecided among ourselves as to the best points to be used as bases with the result that we have passed through an era of disorganization and a period of unsettledness which has been harmful.

The opportunity now presents itself to rectify many mistakes which have occurred in the past, and indications are that we will grasp the opportunity. The efficient equipment, thorough organization and systematic administration of our over-seas bases is one of the prime essentials to victory.

The fleet, without such bases, is bound to act under a handicap which may throw the deciding weight into the scales on the side of the enemy and, as has already been said, we are at least entitled to an even break in the game of war.

The great time it takes to build dry docks, the great distances material will have to travel to get to some of our most important bases, the necessity for transporting everything needed to others, are all facts which we must impress on the minds of those in whose power it lies to give us the things we need. We must also drive home the great truth that time is of vital importance, so that whatever is done may be started at once.

Two weeks before the war in Europe started it was not thought possible that the whole of the powerful nations of the continent would be in the throes of war in less than a month, and by the same reasoning we cannot tell when war may be thrust upon us. We do know that if we are ready the country will be saved millions of money and thousands of priceless lives, and we know that in order to be ready we must begin to prepare at once.

The preparation of our bases is mostly a question of getting the material things at them which the fleet will need, but we must bear in mind the fact that man will have to prepare the material and produce from it the shops, docks, etc. needed, and man can only work at a certain rate and produce a certain amount of results. It is incorrect to say that we can do this after war is declared because it is humanly impossible to do in a short time the many things we have to do to put our bases in the most efficient condition for war.

The land defences of the base cannot be put into the hands of the base commander in the sense that he will have to take active

charge of them. His mission lies in other directions but the very important duty of the land defence should be in the hands of a trained soldier acting under the base commander. This at once makes the detail of army troops impracticable as the law prohibits a naval officer from exercising command over army troops.

Aside from the friction possible, where two branches of the service, which have different methods, are serving together there is the great military difficulty of divided responsibility and no officer wishes to be placed in such a position. It is logical then that with the proper increase of the marine corps there will be provided a body of trained soldiers for the duty of base guards and one used to naval ways and methods. Also it is logical that the troops to form the land defence be those which can be always on the ground over which they would act and be therefore familiar with the situation in a way impossible for troops thrown in, in the emergency calling for the use of troops.

Let us all keep in mind the importance of the bases to the efficiency of the fleet and let us strive to disseminate the very important knowledge that without such bases the fleet is under a handicap which is unfair to it. These auxiliaries have their place in a well-balanced fleet. Let us work for them and let us hope that we may soon see that in the plans of preparation for war the very important bases are not overlooked.

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WAR PROVISIONS FOR GUAM

By P. A. PAYMASTER K. C. MCINTOSH

Shortly after the real occupation of the Marianas by the Spaniards, about 1668, a casual census taken by the missionaries placed the population of those islands at fifty thousand. Of this number, the majority lived in the island of Guam. Taking the earliest reports of the island made public by the European explorers and adventurers, it may be safely assumed that this population was well nourished. They were noted for agility, endurance, and for seamanship. Although lagging and wordy in battle with men, they displayed remarkable courage in battle with nature, and there is record of voyages to the Philippines and even to Hawaii in outrigger canoes, not haphazard, storm-blown voyages, but regular semi-annual trips for purposes of trade. Communication with the Carolines and Pelews was frequent, and Yap was considered a next door neighbor.

Padre Delgado, a missionary-historian of the Pacific Islands who wrote in the eighteenth century, continues the picture of a race of plump, active, effervescent and, on the whole, happy people, who had never seen the necessity of taking thought for the morrow.

An abrupt and disquieting change occurred in 1768, and the Spaniards learned what must sooner or later confront every ruling nation—that a subject people may practice new methods, but seldom, if ever, assimilate new ideas. By royal decree, the Jesuits were banished from Spanish possessions, and their place was taken by the Augustinians. This change may or may not have affected the religious life and welfare of the Chamorros—probably not, as it seems hardly probable that they were particularly interested in the doctrine of predestination or were aware of even the name of

Arminian. But it wrought a mighty change in the routine and welfare of the Chamorro's stomach. The Jesuits have always worked with their hands as well as their heads, and have shown remarkable aptitude for getting work out of others, and particularly out of the uncertainly converted. Under Jesuit leadership the Chamorros had learned a very fair amount of husbandry, and the island was well cultivated. Cattle had been a crown monopoly, cared for by corvée on crown lands. The natives had added many fruits and vegetables to their diet since the Spaniards came, and had learned to eat meat. The Jesuits left, and their successors, zealous for souls, paid no attention to bodies. The "parocco" no longer inspected the crop and demanded news of the harvest. No energetic overseer in black cassock superintended the ploughing and seeding or saw to it that the cattle were regularly salted. And the Chamorros, with their newly-acquired appetite for the flesh pots of the conquering whites, not only reverted, but slumped, to ancestral type. There began an era of semi-hunger that has continued ever since.

The change in economic conditions was so rapid that it was the sudden ruination of one governor. Don Mariano Tobías found his prosperous and paying province suddenly bankrupt, his people ragged and fretful, and his taxes falling off. He was wise enough to see the reason, and he himself attempted to take up the agricultural leadership formerly held by the priests. This sudden entrance of supreme temporal authority into the natives' daily life brought friction and bewildered the farmers. Don Mariano threatened, and presumably called the newly arrived Augustinian friars to account for letting the commissariat take care of itself. At any rate, the only result was a complete estrangement of Don Mariano and the clergy, and the governor, accused of tyranny and oppression by one Abbé Reynal, was superseded by another and faced trial for misgovernment. Chamorros continued to learn to read, write and sing, neglect their farms and allow the cattle to run wild.

In 1828 Guam reached its low-water mark of endurance. There was nothing to eat, and no way of getting it. The stunted remains of the crown herds were now work-cattle. Typhoons had damaged the cocoanuts. There was not enough corn. And there was nothing else. The incumbent governor finally threw up his hands and asked for help. The governor general sent Don Francisco

Ramon de Villalobos to investigate. As a result of Don Francisco's inquiry, the governor was relieved, Villalobos taking his place. Villalobos spent his first few years of office in a furious campaign against starvation, and through his efforts Guam learned to plant and to eat rice. He also tried to increase the beef supply, but with no enduring result. Then he attacked Guam's poverty, and met his Waterloo. He tried to start potteries as a money product, and strove for the production and sale of surplus crop in good years; but the idea of producing this year to compensate a possible shortage next did not filter through the happy-go-lucky brain of the Chamorro, and Don Francisco's only lasting monument in Guam is a taste for rice and an insufficient crop thereof.

In 1850 Don Pablo Perez grew weary of expecting the natives to help themselves. He knew Guam was fertile. He knew it could be made remunerative. He knew the natives would not look ahead. The old corvée had vanished with the Jesuit fathers, and Don Pablo put in a requisition for a shipload of Filipino convicts to work the crown lands for profit. Whether he would have succeeded in collecting the profit will never be known, for the convicts had hardly landed before they revolted, and Don Pablo was put to the disagreeable necessity of executing his best farm hands and sending the rest back home.

From 1855 to 1866 Don Felipe de la Corte attacked the problem from another side. He saw little necessity for a money crop. His ambition was to guarantee three meals a day, money or no money; and he built storage granaries, planted sugar cane, tried this crop and that, always with the idea of a food reserve. The best commentary on his success was written by himself at the close of his tenure of office. "I have an amazing faculty for making mistakes," he wrote quizzically. His ideas and methods would have raised a community of his native Aragonese to comfort and even wealth—but the Chamorro stolidly planted enough to eat for one year, and if that crop failed he did not eat until next seedtime. He saw no reason for working hard merely to fill the governor's granaries. If the government paid him for his crop, he might be induced to grow as much as five bushels extra for cigar money, but the community-storage idea passed over his head. Don Felipe failed, as did his successor, who revived Perez's notion of importing labor and brought in Japanese. Some of the Japanese died, and some of them got homesick. Of over a hundred,

only one remained in Guam long enough to leave his name and blood behind him.

Guam has never returned to the state in which the Jesuits left it. Since 1828 there has been little actual starvation, but there has been constant and disquieting want. It has simply become a question of luck. In good years the people eat. In bad ones they tighten their belts. And so the first American governor found an island which lived, pig-fashion, any fashion, hand-to-mouth, alternating full stomachs with empty ones, but still *self-supporting;* for in the entire history of Spain's rule there is not one instance of the appropriation of one penny for its support or relief, and of the taxation of the islands a part went regularly into the treasury of the crown.

Where is Guam to-day?

Since 1902 there have been many men who have looked at Guam, either for a few days between passing ships or for several months from the governor's chair, and have unanimously admitted that the greatest obstacle for a military administration to overcome, the one almost insuperable obstacle, is provisioning. One after another has stated that *Guam is not and cannot be made self-supporting!!!*

Which would make it appear that with the coming of the Americans Guam has received its second economic body-blow. But how? We have not only spent every cent received in taxes for the betterment of Guam, but we have poured a million a year into the island. We have improved internal communications and have employed natives wherever natives could be employed. We have cleaned up the place at our expense, not theirs, and put everybody in a fair way to make money from the government payroll. There is evidently connection between our coming and the present helplessness of Guam, yet our effort since 1899 has been to prevent Guam's exploitation by our own people or any one else. What has made this lamentable change? We made it, brother officers, and the day may come when we shall dearly rue it. In time of war we can no longer support Guam with a monthly shipment of food; and we must depend on Guam to support us. Guam cannot at present support herself. Our outlook for a war-ration is therefore rather nebulous. We did it, and this is how we did it.

First of all, steamer connection with the Philippines was stopped by the war, subsequently kept stopped by removal of the former mail subsidy to the steamer lines. Guam's mail now came from the eastward, carried in army transports. Moreover, with the agricultural growth of the southern islands, the Philippines had no ships to spare for junketing through the Marianas; and the Carolines and Pelews now flew another flag. Guam never shipped a great amount, but in Spanish times her shipments were the only source of money the island had. If money was needed, the planter shook off his drowsiness and dried copra or picked bergamot or raised coffee and cacao. In a few months he had good Philippine coins jingling in his pocket to bet in the cockpit or to buy a new suit of dungarees. We stopped this incoming trickle of silver and copper. The population of Guam is now around thirteen thousand, and of these the tax-books show about two thousand five hundred to be men between the ages of 18 and 60—normally two thousand producing males. In the slack years of 1911, 1912 and 1913, when there was little government work beyond road repairs, the labor roll as submitted monthly showed a total of *four hundred of these producing males* working for the government at building roads. Twenty per cent of the island's productive power employed in spreading and rolling cascajo and gravel!! In busy years there have at times been 40 per cent so employed. We stopped the influx of silver and copper for which the natives were obliged to produce *food*. We opened the sluicegate of a flood of gold which they could receive only by stopping the production of food and selling their labor instead. In a community where every man owns his own patch of land and there are no large ranches, that meant an immediate stoppage of from 20 to 50 per cent in *food production*. The Chamorro could work on the road one week, run a bill at the Japanese trading-post for food and clothes, rest his tired bones for three weeks, and after visiting the pay office, pay his monthly bill and buy a cigar. Crœsus knew nothing more satisfying than this. Work on the ranch? Foolish! And what ranch in Guam could hope to produce canned and barrelled salmon, corned beef, white potatoes, hardtack, "dobie" cigarettes and beer? No, this is the life!

We taught class after class of boys in the schools how to be farmers. If any one of them had a desire to work his ancestral plot in the light of his new knowledge, one look at the tangled

jungle growth that had swallowed the formerly lucrative cacao-patch was enough. His stomach cried for the sardines of the Americanos, and so he drifted onto the government payroll at 48 cents a day—the price of 16 pounds of copra—and upward.

Like the Spaniards, we have introduced new appetites. Unlike the Spaniards, we have not made their appeasement depend upon excess food production, but directly upon diminished food-production. And some day a few of us are going to curse a scurvy diet of cocoanut and caribao meat, tighten our belts and split our last piece of hardtack with a hungry Chamorro baby. We did it, and when in that day we begin to hurl rocks at the shiftlessness of the Chamorro farmer, we may listen for the shattered tinkle of our own crystal walls.

Thus the matter stands. The Chamorros, thanks to us and to us alone, are as helpless as fattened guinea-pigs. If Guam is worth holding at all—and it seems unnecessary to debate that subject among military men—it is worth putting into self-supporting, defensible condition. How can we do it?

We have tried, as the Spaniards tried before us, to make the Chamorros do it themselves, and the results are *nil*. Frankly, one cannot entirely blame the Chamorro, as is instanced by the following true tale of four years ago:

The monthly transport came into the harbor with a month's provisions—and smallpox. Consequently, the month's provisions went on to Manila, undischarged. The American population, about a hundred and seventy-five, saw thirty long, meatless days ahead. Efforts were made to purchase native beef to tide over the emergency, and a very small amount was procured. It was passable beef, but was not Chicago or Australian beef by several degrees; and the next shipment was received with enthusiasm. It was then decided that it might be well to encourage native beef production, and negotiations were opened with the one considerable cattle owner of the island with a view to getting him to corn-feed a limited number of cattle monthly for naval station use. He asked what the station could pay, and was told that we usually paid from 8 to 11 cents a pound, dressed. His answer was as follows: "I can sell my cattle, grass-fed, on the hoof, in the city market, for a fraction over 10. I can sell at that rate all that my present herd can produce without depletion. To prepare cattle for you by corn-feeding, penning, dressing and storing, would

mean that you will have to pay for it all of that extra expense over and above what I can get now, to enable me to break even. If you will guarantee to buy a monthly quantity, and that of considerable size, and guarantee that I will not get less net from it than the amount I can get now, I will increase my herd. But I won't do it on a gamble." And there you are.

At various times during the period which the writer served in Guam, gallant and unavailing efforts were made to stimulate the production of fresh vegetables and fruits. Production was not stimulated, and a planter gave me this reason. "One time I plant some radish and cucumber. Everybody say, yes, they like to buy if I will bring. Those radish got ready to eat one day on the 27th of the month. Nex' day I take into town to sell, and everybody say, 'Transport jus' come in, have got plenty fresh 'Merican vegetable. Come again.' Radish and cucumber spoil. I have sell 10 cents worth."

Mangoes and alligator pears cannot be brought from "'Merica," and these two items are conspicuously the only ones which the Chamorros will endeavor to supply. For the rest, we have allowed and continue to allow the Mare Island and army quartermaster contracts to outbid them on the very articles we demand that they shall produce.

But we have done more than that. The main item of the Chamorro's diet is fish of some kind. Not only has the government payroll made canned salmon imported from 'Merica obtainable, but it has taken the laborer out of his fishing-boat to work on the roads. In case he should want to fish on his holidays, we have levied a fisherman's tax of $2 a head—a week's salary gone for the privilege of going out in his own boat on the broad ocean and catching his supper when he grows tired of the tin-can variety. That price of 10 cents a pound on the hoof which we could not pay the cattleman was a direct result of a tax of over $400 a year levied on the island's one authorized butcher in order that he may be allowed to butcher. To meet this tax, the authorized butcher has been forced to levy a small rental for market-place stalls, formerly free, and the fresh-vegetable women had to quit their accustomed counters and benches. They spread their wares on the much-trodden ground, and the Americans, who were the only paying customers, refused to buy. So the fresh-vegetable women

have gone out of business and have put their sons to work on the road.

Now, not only the garrison has got to eat in war-time, but the natives as well. We can depend on each Chamorro, when he has nothing else to do, to plant enough tough yams and taro to keep him alive until the war ends and he can get another job; but we cannot make him do more, for we demand that he do it as a losing proposition—work to get his hand in, in case we ever need his product, but work for nothing. And "camote" and taro will not sustain a white man. It is up to us to provide our own war-ration —*and the war-ration of thirteen thousand Chamorros as well.*

The best first-aid has already been applied, and a little of the crying need is eased by the recent placing of the U. S. S. *Supply* into freight-carrying service to and from Manila, giving an outlet to surplus products of the few—discouragingly few—who will raise them, and the coincident falling off of the monthly labor-rolls, forcing a few more to raise crops for tax-money and clothing. But that is not enough. The "government payroll" menace to Guam's independence must be totally removed, and in as short a time as possible without causing distress, even at the expense of having all government work done by contract and temporarily imported labor. Incidentally, this method would probably prove less expensive than it would seem, for a contract laborer at $2 a day would accomplish quite as much as six of the average 48-cents-a-day Chamorros at any work requiring skill or thought. The objection to contract labor—that it makes the preservation of military secrets difficult—cannot weigh in this question, for in Guam there are none, and until we change our methods there can never be. At least two foreign governments possess better topographical maps of the island than we, and the masters of the copra schooners that run in and out know more of the island's characteristics than any American ever in Guam. With schooners drawing up to 12 feet, they regularly make use of bights and shelters around the island, *the existence of which were unknown to even the American Government prior to 1913.* I have known a schooner of a hundred and fifty tons to be in and around Guam for six days taking cargo, and her presence only made known to the American officials when she entered the harbor of Apra to demand her clearance papers. This is an island thirty miles by nine at the widest points. Cheering result of seventeen year's occupation

and fifteen million dollars! No, the big work of preparing Guam in a military way must not depend on Chamorro labor. We must mount our own guns, build our roads by contract, and do our dredging and wharf-building either with our own or imported men. The Chamorros must again learn to feed themselves, and we can force them to learn in no other way.

Equally is it apparent that we must provide our own meat supply—and this, luckily, we can easily do at nominal initial expense by establishing our own herds of cattle and swine on our own government—formerly crown—lands. We have known that for some years. The cattle-ranch plans were prepared at least three years ago. I believe that to-day the government owns two bull caribaos and possibly a milch cow for the hospital. And we call the Chamorro shiftless!

We must provide ourselves with rat-and-insect-proof storage for the things that cannot be raised in Guam—flour, sugar, cocoa, salt, desiccated potatoes, for ourselves; salmon, flour and hard-tack for the natives—and fill these storehouses. We know it. We have known it for years. Our preparations to raise vegetables against a possible siege of Guam have not as yet taken the tangible form of the purchase of one package of seeds. We have spent fifteen million dollars, and where has it gone? The records will tell you. Some of it has built roads, some of it has dredged a small boat channel. *But 80 per cent of it has gone to the transport, storage, refrigeration and care of the monthly supply of food which we now insist on having from the United States.* Encouraging to the local market and economical as this may be, it is absolutely true.

Do you see any advantage to be gained by keeping Guam? If so, do not forget that holding it is the navy's business, and it is up to the navy to make it tenable. Not only guns, docks and shops. First and last, there must be food. We have got to supply it, for we have put the power to supply beyond the Chamorro's reach. And supplying food for an isolated Guam means hard work and long preparation beforehand.

We have the experience of three hundred and fifty years to show us that the Chamorro cannot prosper after the manner of the Spaniard or the Saxon. We must make him work for himself, and only himself, Chamorro-fashion, where he can see the effect of every hand's turn of work on his own personal prosperity. If

we make him till his land—and we can if we remove the easy money of "government jobs"—he will soon again be self-supporting.

Our problem will then be only war-ration for ouselves. With our own beef herds on Barrigada and Chachao, our own pork rooting through the jungle, and a year's dry provisions in the storehouse, Guam can face a war. Instead of exporting his coffee, chocolate and fruits, the Chamorro will sell to the garrison. With his main money crop—copra—blockaded, he will turn to the reserve supply of vegetable seeds we shall have in store for him, and we will not much miss the monthly transport.

But the navy must bring all this to pass. The Chamorro will not do it for us, and Congress has no time for such a trifle. You and I are the navy. *Il nous faut cultiver nôtre jardin.*

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

METHOD OF CALCULATING THE INTERSECTION POINT OF ST.-HILAIRE POSITION LINES

By Ernest K. Roden

By the aid of plotting sheets now issued by the Hydrographic Office, the plotting of position lines has become a comparatively easy task and at the same time, because of the large scale on which these plotting sheets are constructed, the accuracy of the fix has been increased. Yet an opinion prevails that the point of intersection of two position lines should be calculated as well as plotted. In the case of finding by calculation the intersection point of position lines computed by the St.-Hilaire method, three or four methods have been devised. Among these may be mentioned those by Dr. Fulst and Professor Goodwin as being the simplest and perhaps the least complicated.

Dr. Fulst's method was very thoroughly explained in the issue of the U. S. Naval Institute Proceedings of September, 1913, by Lieut. Commander DeAquino of the Brazilian Navy, while Professor Goodwin's method and table were published in the January and February, 1913, issues of the *Nautical Magazine*. In the present article attention is called to a method of calculating the fix of two lines, that, in the opinion of the writer, offers more convenience and greater facility than the methods just referred to. In addition to ordinary traverse tables only a short two-page special table is required.

The method consists in determining the D. Lat. and the D. Long. between the assumed, or dead reckoning, position and the final fix. Thus, in Fig. 1, if the angles a_1 and a_2 represent the azimuths and h_1 and h_2 the corresponding intercepts, the point of intersection Z of the two position lines EZ and CZ is found by determining BD, the D. Lat., and DZ, the Dep. To find BD and DZ

from the known quantities $a_1 a_2$ and $h_1 h_2$, it is convenient to make use of an auxiliary triangle RZF formed by extending the position line CZ to meridian BF. It will be noticed that if, in this auxiliary triangle, a perpendicular is drawn from Z towards the meridian, the angle $RZD = a_2$ and the angle $DZF = a_1$, from which follows

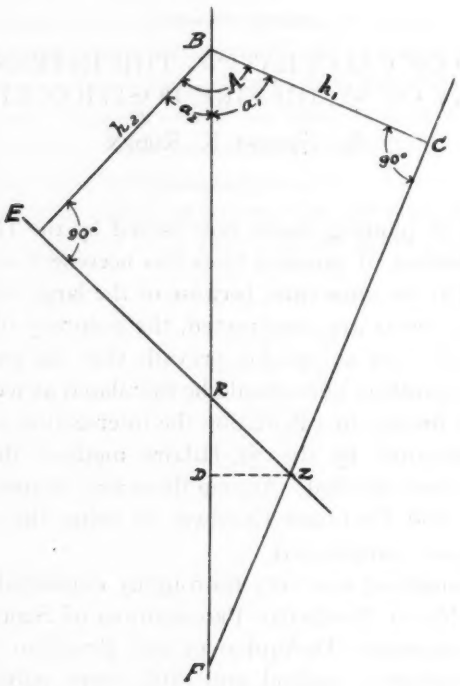

FIG. 1

that the sum of these angles or RZF is equal to the angle A, or the sum of azimuths.

The procedure of finding the D. Lat. and Dep. may now be accomplished as follows:

In the right triangle BCF, Fig. 1, we have

$$BF = h_1 \sec a_1.$$

In the right triangle BER, we have

$$BR = h_2 \sec a_2.$$

Hence,

$$FR = BF - BR = h_1 \sec a_1 - h_2 \sec a_2.$$

In the triangle RZF, we have

$$RZ : FR = \sin RFZ : \sin FZR.$$

Now, the angle

$$RFZ = (90° - a_1)$$

and the angle

$$FZR = (a_2 + a_1) = A.$$

Therefore,

$$RZ : FR = \sin(90° - a_1) : \sin A$$

whence,

$$RZ = \frac{FR \sin(90° - a_1)}{\sin A} = \frac{FR \cos a_1}{\sin A}.$$

Substituting in this equation the value of FR previously obtained, we have

$$RZ = \frac{(h_1 \sec a_1 - h_2 \sec a_2)\cos a_1}{\sin A}.$$

But, $\sec a_1 \times \cos a_1 = 1$; hence,

$$RZ = \frac{h_1 - h_2 \sec a_2 \cos a_1}{\sin A}.$$

To find the departure DZ a perpendicular is dropped from Z toward RF. In the right triangle RDZ

$$DZ = RZ \cos a_2.$$

Substituting in this equation the value of RZ found above, we get

$$DZ = \frac{\cos a_2 (h_1 - h_2 \sec a_2 \cos a_1)}{\sin A}.$$

But, $\cos a_2 \times \sec a_2 = 1$; hence,

$$DZ = \frac{h_1 \cos a_2 - h_2 \cos a_1}{\sin A}$$

whence,

$$DZ = \operatorname{cosec} A (h_1 \cos a_2 - h_2 \cos a_1).$$

To find the D. Lat., BD, Fig. 1, we have in the right triangles BER and RDZ

$$BR = h_2 \sec a_2;$$

$$RD = RZ \sin a_2$$

$$BR + RD = h_2 \sec a_2 + RZ \sin a_2$$

or,

$$BD = h_2 \sec a_2 + RZ \sin a_2.$$

Substituting the value of RZ previously found, we get

$$BD = h_2 \sec a_2 + \frac{(h_1 - h_2 \sec a_2 \cos a_1) \sin a_2}{\sin A}.$$

Multiplying, the equation becomes

$$BD = h_2 \sec a_2 + \frac{h_1 \sin a_2 - h_2 \tan a_2 \cos a_1}{\sin A}.$$

Transposing,

$$BD = h_2 \sec a_2 - \frac{h_2 \tan a_2 \cos a_1}{\sin A} + \frac{h_1 \sin a_2}{\sin A}.$$

Now, $\sec a_2 = \frac{1}{\cos a_2}$; hence,

$$BD = \frac{h_2}{\cos a_2} - \frac{h_2 \tan a_2 \cos a_1}{\sin A} + \frac{h_1 \sin a_2}{\sin A}.$$

Since $\tan a_2 = \frac{\sin a_2}{\cos a_2}$, by substituting this value and factoring, we get

$$BD = h_2 \left(\frac{1}{\cos a_2} - \frac{\sin a_2 \cos a_1}{\cos a_2 \sin A} \right) + \frac{h_1 \sin a_2}{\sin A}.$$

Placing the terms within the parenthesis under a common denominator, the equation becomes

$$BD = h_2 \frac{\sin A - \sin a_2 \cos a_1}{\cos a_2 \sin A} + \frac{h_1 \sin a_2}{\sin A}.$$

But the angle $A = (a_1 + a_2)$; hence,

$$BD = h_2 \frac{\sin (a_1 + a_2) - \sin a_2 \cos a_1}{\cos a_2 \sin A} + \frac{h_1 \sin a_2}{\sin A}.$$

Again, $\sin (a_1 + a_2) = \sin a_1 \cos a_2 + \cos a_1 \sin a_2$; hence,

$$BD = h_2 \frac{\sin a_1 \cos a_2 + \sin a_2 \cos a_1 - \sin a_2 \cos a_1}{\cos a_2 \sin A} + \frac{h_1 \sin a_2}{\sin A}.$$

Canceling, the equation becomes

$$BD = \frac{h_2 \sin a_1}{\sin A} + \frac{h_1 \sin a_2}{\sin A}.$$

whence,

$$BD = \operatorname{cosec} A (h_2 \sin a_1 + h_1 \sin a_2).$$

The formulas found may now be used in calculating the D. Lat. and Dep. of the point of intersection of any two lines of position computed by the St.-Hilaire method. Assuming that a_1 and h_1 represent, respectively, the first azimuth and intercept, a_2 and h_2

the second azimuth and intercept, as in the foregoing demonstration, the formulas are:

$$\text{D. Lat.} = \operatorname{cosec} A\,(h_1 \sin a_2 + h_2 \sin a_1)$$
$$\text{Dep.} \quad = \operatorname{cosec} A\,(h_1 \cos a_2 - h_2 \cos a_1).$$

While the formulas appear easy of manipulation, certain rules must be followed to meet and comply with the terms involved. Thus, by examining the two formulas it will be noticed that each intercept is multiplied by the sine or cosine of the opposite azimuth.

To meet this condition it is necessary to exchange the intercepts before multiplying, considering h_1 with a_2 and h_2 with a_1.

By the use of Table 1, which gives the product of cosecants of angles from 20° to 90° and for intercepts from 1 to 18 miles, and the Traverse Tables the actual numerical values of D. Lat. and Dep. are determined. But in order that these values may be correctly named, it is necessary to "swing" the azimuths to the adjacent quadrants. The transfer of the azimuths and the interchanging of the intercepts may be performed as one operation, care being taken when transferring each of the azimuths to refer its numerical value to the north or south point, and to transfer the azimuths in opposite directions and the nearest way.

Example 1.—Assumed position Lat. 50° 14′ N., Long. 27° 19′ W. The azimuth and intercept at first sight are, respectively, S. 30° E. 9 miles (+); at second sight S. 42° W. 7 miles (+). Find Lat. and Long. of fix.

Proceed as follows: First transfer the azimuths to the adjacent quadrants as indicated by arrows in Fig. 2. In this case the first azimuth is S. 30° E. and when transposed becomes S. 30° W. The second azimuth is S. 42° W. and when transposed becomes S. 42° E. Thence,

For intercept 9 miles the azimuth is S. 42° E.
For intercept 7 miles the azimuth is S. 30° W.

In this case the sum of azimuths, designated A, is $42° + 30° = 72°$. If A exceeds 90° its supplement is used. Each intercept is now multiplied by the cosecant for A. To facilitate this multiplication, Table 1 is used, entering with intercept at top and with A in the side column. Thus,

For intercept 9 and 72° the product is 9.5.
For intercept 7 and 72° the product is 7.4.

These factors are now entered in a traverse as distances with azimuths as courses:

Azimuths	Factors	D. Lat.		Dep.	
		N	S	E	W
S 42° E	9.5	—	6.4	7.1	—
S 40° W	7.4	—	3.7	—	6.4

D. Lat. = 10.1′ S. Dep. = 0.7′ E.

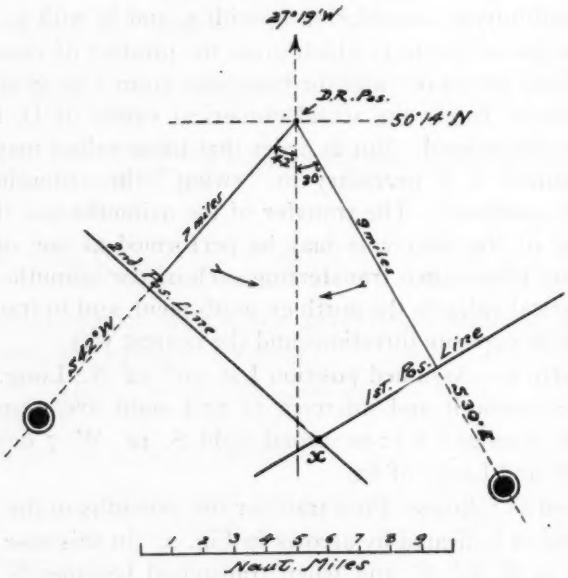

FIG. 2

In picking out the D. Lat. and Dep. from ordinary traverse tables, reverse the data by entering the D. Lat. in the Dep. column; or, read the tables from the bottom when azimuths are less than 45°, and from the top when greater than 45°. This is necessary on account of the change made in names of original azimuths.

The D. Lat. and Dep. is now applied to the assumed, or dead reckoning, position, in the usual way; thus,

D. R. Lat. = 50° 14′ N.	D. R. Long. = 27° 19′ W.
D. Lat. = 10.1′ S.	D. Long. = 0.9′ E.
Lat. of fix = 50° 3.9′ N.	Long. of fix = 27° 18.1′ W.

Example 2. Assumed position Lat. 34° 37′ S., Long. 8° 51′ W. First azimuth and intercept = S. 28° W., 9.5 miles (−). Second azimuth and intercept = N. 48° W., 5 miles (−). Find point of intersection.

In this case both intercepts are negative or away from the observed bodies. Transfer azimuths to adjacent quadrants which gives S. 28° E. for intercept 5, and N. 48° E. for intercept 9.5 (see Fig. 3).

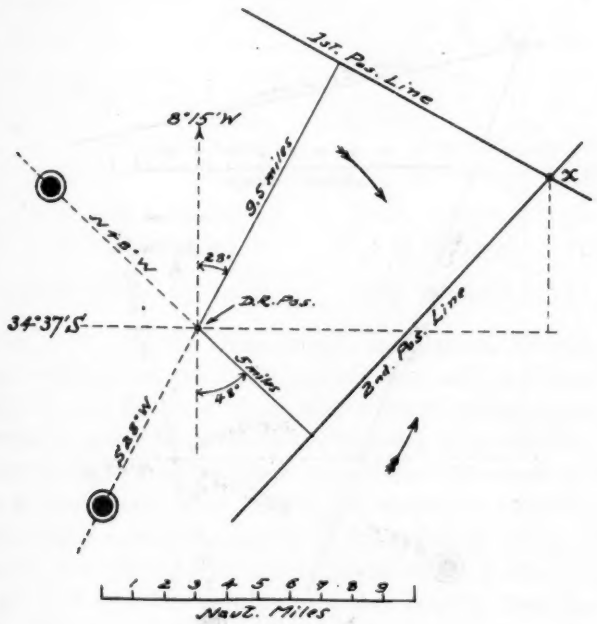

FIG. 3

$$A = 180° - (62° + 42°) = 76°.$$

For intercept 5 and 76°, Table 1 gives 5.2.
For intercept 9.5 and 76°, Table 1 gives 9.8.

Azimuths	Factors	D. Lat.		Dep.	
		N	S	E	W
S 28° E	5.2	—	2.4	4.6	—
N 48° W	9.8	7.3	—	6.6	—

D. Lat. = 4.9′ N. Dep. = 11.2′ E.
D. Long. = 13.6′ E.

Assumed Lat. =	34° 37′ S.	Long. =	8° 51′ W.
D. Lat. =	4.9′ N.	D. Long. =	13.6′ E.
Lat. of fix =	34° 32.1′ S.	Long. of fix =	8° 37.4′ W.

It will be noticed that Table 1 may be used also to pick out the D. Long. corresponding to the departure obtained. This is done by entering the Dep. in top column with latitude in vertical column to the right.

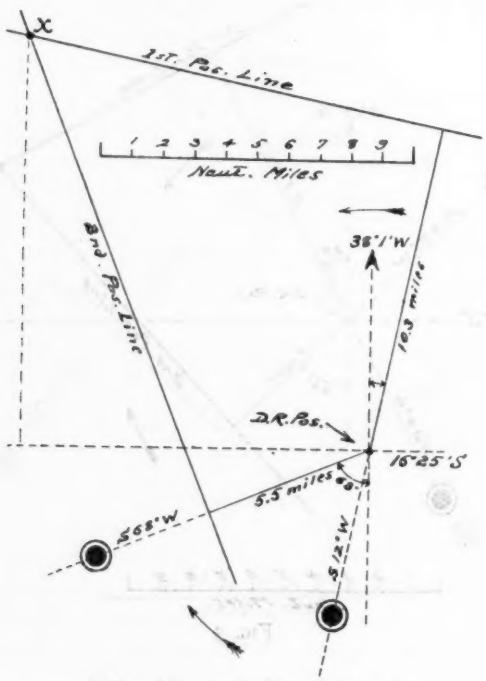

FIG. 4

Example 3. Position by dead reckoning Lat. 16° 25′ S., Long. 38° 1′ W. Azimuth and intercept at first sight: S. 12° W., 10.3 miles (−); at second sight: S. 68° W., 5.5 miles (+). Find latitude and longitude of fix.

In this case one intercept is positive, the other negative. The latter is therefore laid off in the opposite direction or N. 12° E., as shown in Fig. 4. As before, each azimuth is transferred to the nearest adjacent quadrant; thus,

For intercept 5.5 miles the azimuth is N. 12° W.
For intercept 10.3 miles the azimuth is N. 68° W.

$$A = 68° - 12° = 56°.$$

Then,

For intercept 5.5 and 56°, Table 1 gives 6.6.
For intercept 10.3 and 56°, Table 1 gives 12.5.

Azimuths	Factors	D. Lat.		Dep.	
		N	S	E	W
N 12° W	6.6	1.4	—	—	6.5
N 68° W	12.5	11.6	—	—	4.7

D. Lat. = 13.0′ N. Dep. = 11.2′ W.
D. Long. = 11.7′ W

D. R. Lat. = 16° 25′ S. D. R. Long. = 38° 1′ W.
D. Lat. = 13. N. D. Long. = 11.7 W.

Lat. of fix = 16° 12′ S. Long. of fix = 38° 12.7′ W.

After some practice these simple calculations should be performed without the aid of a diagram, but until proficiency is attained it is well to use a rough sketch representing azimuths and intercepts to avoid mistakes in the transfer of azimuths.

It will be noticed that Table 1 is limited to a distance of 18 miles. If intercepts exceed that length the excess is entered and the corresponding number is added to those for 18 miles. Thus, if the angle A is 46° and the intercept 26 miles, Table 1 is entered with 46° and 18. The resulting number is 25.0; then the number corresponding to 46° and 8 miles, which is 11.1, is picked out. The factor corresponding to 46° and 26 miles is therefore 25.0 + 11.1 = 36.1. The D. Lat. and Dep. obtained in each of the three examples given may be verified by actual measurement in the accompanying diagrams.

TABLE I

Azimuth Diff.	Intercepts, also Departure																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Lat.
90°	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0	18.0	0°
86	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0	18.0	4
84	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.1	11.1	12.1	13.1	14.1	15.1	16.1	17.1	18.1	6
82	1.0	2.0	3.0	4.0	5.0	6.1	7.1	8.1	9.1	10.1	11.1	12.1	13.1	14.1	15.1	16.2	17.2	18.2	8
80	1.0	2.0	3.0	4.1	5.1	6.1	7.1	8.1	9.1	10.2	11.2	12.2	13.2	14.2	15.2	16.2	17.3	18.3	10
78	1.0	2.0	3.1	4.1	5.1	6.1	7.2	8.2	9.2	10.2	11.2	12.3	13.3	14.3	15.3	16.4	17.4	18.4	12
76	1.0	2.1	3.1	4.1	5.2	6.2	7.2	8.2	9.3	10.3	11.3	12.4	13.4	14.4	15.5	16.5	17.5	18.6	14
74	1.0	2.1	3.1	4.2	5.2	6.2	7.3	8.3	9.4	10.4	11.4	12.5	13.5	14.6	15.6	16.6	17.7	18.7	16
72	1.1	2.1	3.2	4.2	5.3	6.3	7.4	8.4	9.5	10.5	11.6	12.6	13.7	14.7	15.8	16.8	17.9	18.9	18
70	1.1	2.1	3.2	4.3	5.3	6.4	7.4	8.5	9.6	10.6	11.7	12.8	13.8	14.9	16.0	17.0	18.1	19.2	20
69	1.1	2.1	3.2	4.3	5.4	6.4	7.5	8.6	9.6	10.7	11.8	12.9	13.9	15.0	16.1	17.1	18.2	19.3	21
68	1.1	2.2	3.2	4.3	5.4	6.5	7.5	8.6	9.7	10.8	11.9	12.9	14.0	15.1	16.2	17.3	18.3	19.4	22
67	1.1	2.2	3.3	4.3	5.4	6.5	7.6	8.7	9.8	10.9	12.0	13.0	14.1	15.2	16.3	17.4	18.5	19.6	23
66	1.1	2.2	3.3	4.4	5.5	6.6	7.7	8.8	9.9	10.9	12.0	13.1	14.2	15.3	16.4	17.5	18.6	19.7	24
65	1.1	2.2	3.3	4.4	5.5	6.6	7.7	8.8	9.9	11.0	12.1	13.2	14.3	15.4	16.6	17.7	18.8	19.9	25
64	1.1	2.2	3.3	4.5	5.6	6.7	7.8	8.9	10.0	11.1	12.2	13.4	14.5	15.6	16.7	17.8	18.9	20.0	26
63	1.1	2.2	3.4	4.5	5.6	6.7	7.9	9.0	10.1	11.2	12.3	13.5	14.6	15.7	16.8	18.0	19.1	20.2	27
62	1.1	2.3	3.4	4.5	5.7	6.8	7.9	9.1	10.2	11.3	12.5	13.6	14.7	15.9	17.0	18.1	19.3	20.4	28
61	1.1	2.3	3.4	4.6	5.7	6.9	8.0	9.1	10.3	11.4	12.6	13.7	14.9	16.0	17.2	18.3	19.4	20.6	29
60	1.2	2.3	3.5	4.6	5.8	6.9	8.1	9.2	10.4	11.5	12.7	13.9	15.0	16.2	17.3	18.5	19.6	20.8	30
59	1.2	2.3	3.5	4.7	5.8	7.0	8.2	9.3	10.5	11.7	12.8	14.0	15.2	16.3	17.5	18.7	19.8	21.0	31
58	1.2	2.4	3.5	4.7	5.9	7.1	8.3	9.4	10.6	11.8	13.0	14.2	15.3	16.5	17.7	18.9	20.0	21.2	32
57	1.2	2.4	3.6	4.8	5.0	7.2	8.3	9.5	10.7	11.9	13.1	14.3	15.5	16.7	17.9	19.1	20.3	21.5	33
56	1.2	2.4	3.6	4.8	5.0	7.2	8.4	9.6	10.9	12.1	13.3	14 5	15.7	16.9	18.1	19.3	20.5	21.7	34
55	1.2	2.4	3.7	4.9	6.1	7.3	8.5	9.8	11.0	12.2	13.4	14.6	15.9	17.1	18.3	19.5	20.8	22.0	35
54	1.2	2.5	3.7	4.9	6.2	7.4	8.7	9.9	11.1	12.4	13.6	14.8	16.1	17.3	18.5	19.8	21.0	22.2	36
53	1.3	2.5	3.8	5.0	6.3	7.5	8.8	10.0	11.3	12.5	13.8	15.0	16.3	17.5	18.8	20.0	21.3	22.5	37
52	1.3	2.5	3.8	5.1	6.3	7.6	8.9	10.2	11.4	12.7	14.0	15.2	16.5	17.8	19.0	20.3	21.6	22.8	38
51	1.3	2.6	3.9	5.1	6.4	7.7	9.0	10.3	11.6	12.9	14.2	15.4	16.7	18.0	19.3	20.6	21.9	23.2	39
50	1.3	2.6	3.9	5.2	6.5	7.8	9.1	10.4	11.7	13.1	14.4	15.7	17.0	18.3	19.6	20.9	22.2	23.5	40

50	1.3	2.6	3.9	5.2	6.5	7.8	9.1	10.4	11.7	13.1	14.4	15.7	17.0	18.3	19.6	20.9	22.2	23.5	40

TABLE I—CONTINUED

Azimuth Diff.	Intercepts, also Departure																		Lat.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
49°	1.3	2.7	4.0	5.3	6.6	8.0	9.3	10.6	11.9	13.3	14.6	15.9	17.2	18.6	19.9	21.2	22.5	23.9	41°
48	1.3	2.7	4.0	5.4	6.7	8.1	9.4	10.8	12.1	13.5	14.8	16.1	17.5	18.8	20.2	21.5	22.9	24.2	42
47	1.4	2.7	4.1	5.5	6.8	8.2	9.6	10.9	12.3	13.7	15.0	16.4	17.8	19.1	20.5	21.9	23.2	24.6	43
46	1.4	2.8	4.2	5.6	7.0	8.3	9.7	11.1	12.5	13.9	15.3	16.7	18.1	19.5	20.9	22.2	23.6	25.0	44
45	1.4	2.8	4.2	5.7	7.1	8.5	9.9	11.3	12.7	14.1	15.6	17.0	18.4	19.8	21.2	22.6	24.0	25.5	45
44	1.4	2.9	4.3	5.8	7.2	8.6	10.1	11.5	13.0	14.4	15.8	17.3	18.7	20.2	21.6	23.0	24.5	25.9	46
43	1.5	2.9	4.4	5.9	7.3	8.8	10.3	11.7	13.2	14.7	16.1	17.6	19.1	20.5	22.0	23.5	24.9	26.4	47
42	1.5	3.0	4.5	6.0	7.5	9.0	10.5	12.0	13.5	14.9	16.4	17.9	19.4	20.9	22.4	23.9	25.4	26.9	48
41	1.5	3.0	4.6	6.1	7.6	9.1	10.7	12.2	13.7	15.2	16.8	18.3	19.8	21.3	22.9	24.4	25.9	27.4	49
40	1.6	3.1	4.7	6.2	7.8	9.3	10.9	12.4	14.0	15.6	17.1	18.7	20.2	21.8	23.3	24.9	26.4	28.0	50
39	1.6	3.2	4.8	6.4	7.9	9.5	11.1	12.7	14.3	15.9	17.5	19.1	20.7	22.2	23.8	25.4	27.0	28.6	51
38	1.6	3.2	4.9	6.5	8.1	9.7	11.4	13.0	14.6	16.2	17.9	19.5	21.1	22.7	24.4	26.0	27.6	29.2	52
37	1.7	3.3	5.0	6.6	8.3	10.0	11.6	13.3	15.0	16.6	18.3	19.9	21.6	23.3	24.9	26.6	28.2	29.9	53
36	1.7	3.4	5.1	6.8	8.5	10.2	11.9	13.6	15.3	17.0	18.7	20.4	22.1	23.8	25.5	27.2	28.9	30.6	54
35	1.7	3.5	5.2	7.0	8.7	10.5	12.2	13.9	15.7	17.4	19.2	20.9	22.7	24.4	26.2	27.9	29.6	31.4	55
34	1.8	3.6	5.4	7.2	8.9	10.7	12.5	14.3	16.1	17.9	19.7	21.5	23.2	25.0	26.8	28.6	30.4	32.2	56
33	1.8	3.7	5.5	7.3	9.2	11.0	12.9	14.7	16.5	18.4	20.2	22.0	23.9	25.7	27.5	29.4	31.2	33.0	57
32	1.9	3.8	5.7	7.5	9.4	11.3	13.2	15.1	17.0	18.9	20.8	22.6	24.5	26.4	28.3	30.2	32.1	34.0	58
31	1.9	3.9	5.8	7.8	9.7	11.6	13.6	15.5	17.5	19.4	21.4	23.3	25.2	27.2	29.1	31.1	33.0	34.9	59
30	2.0	4.0	6.0	8.0	10.0	12.0	14.0	16.0	18.0	20.0	22.0	24.0	26.0	28.0	30.0	32.0	34.0	36.0	60
29	2.1	4.1	6.2	8.3	10.3	12.4	14.4	16.5	18.6	20.6	22.7	24.8	26.8	28.9	30.9	33.0	35.1	37.1	61
28	2.1	4.3	6.4	8.5	10.7	12.8	14.9	17.0	19.2	21.3	23.4	25.6	27.7	29.8	32.0	34.1	36.2	38.3	62
27	2.2	4.4	6.6	8.8	11.0	13.2	15.4	17.6	19.8	22.0	24.2	26.4	28.6	30.8	33.0	35.2	37.4	39.6	63
26	2.3	4.6	6.8	9.1	11.4	13.7	16.0	18.2	20.5	22.8	25.1	27.4	29.7	31.9	34.2	36.5	38.8	41.1	64
25	2.4	4.7	7.1	9.5	11.8	14.2	16.6	18.9	21.3	23.7	26.0	28.4	30.8	33.1	35.5	37.9	40.2	42.6	65
24	2.5	4.9	7.4	9.8	12.3	14.8	17.2	19.7	22.1	24.6	27.0	29.5	32.0	34.4	36.9	39.3	41.8	44.3	66
23	2.6	5.1	7.7	10.2	12.8	15.4	17.9	20.5	23.0	25.6	28.2	30.7	33.3	35.8	38.4	40.9	43.5	46.1	67
22	2.7	5.3	8.0	10.7	13.3	16.0	18.7	21.4	24.0	26.7	29.4	32.0	34.7	37.4	40.0	42.7	45.4	48.1	68
21	2.8	5.6	8.4	11.2	14.0	16.7	19.5	22.3	25.1	27.9	30.7	33.5	36.3	39.1	41.9	44.6	47.4	50.2	69
20	2.9	5.8	8.8	11.7	14.6	17.5	20.5	23.4	26.3	29.2	32.2	35.1	38.0	40.9	43.9	46.8	49.7	52.6	70

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

ENGINEERING POST-GRADUATE SCHOOLS FROM THE STUDENT STANDPOINT

By LIEUTENANT (J. G.) E. E. WILSON, U. S. Navy

It is the object of this paper to discuss the subject indicated in the title, with the purpose of bringing before the service the necessity for post-graduate schools, the methods of conducting them, and the results attained by them. The Navy Regulations define the limits of the schools from the standpoint of the Navy Department, and it is believed that a short discussion of them from the standpoint of a student who has completed one of the courses will be of interest. Since the present method is quite new, the details of administration are subject to such changes that a description of details at this time will be incorrect at some future date. I will, therefore, describe but one course, that with which I am most familiar, and will make this description entirely general. It is believed that the discussion of the necessity for such schools, together with the results attained by them, will be of interest mostly to officers who, through lack of contact with them, do not favor their existence, while the methods of conducting them will be of interest mostly to young officers who are eligible for assignment and desire to know the character of such duty.

THE NECESSITY FOR POST-GRADUATE TRAINING

Post-graduate schools now occupy something of the position formerly held by the War College, in that they are subject to opposition from certain officers belonging to that school which believes that the way to learn engineering is to go to sea with machinery in ships. In civil establishments there is sometimes found the same situation. The so-called " practical engineer " has little respect for the college professor, who, though possessing a

knowledge of Thermodynamics, is unable to fit a bearing to an engine. On the other hand, the college professor is inclined to look down upon the practical man with his limited scientific knowledge. Of course, the solution of the problem lies in a better understanding, and in such cooperation that each is able to avail himself of the special knowledge of the other, to their common advantage.

The need for advanced education in engineering is making itself strangely felt ashore to-day. There, engineering is utilized mostly in the manufacture of something, under keen competition, and success is measured by the return to the stockholders of interest on the investment. Our problem is quite a different one, being concerned first in the production of results from the military standpoint, with the money problem often a secondary one. Ashore, engineers, after a certain general study in the branch they are to pursue, find employment with a concern engaged in the manufacture of some one particular class of work. After mastering the details of the processes it becomes apparent that with certain special training in that particular subject the engineer may make himself much more valuable to his employer, and he looks about for a place to study. So insistent has the demand become for such an institution that Columbia University is organizing a special post-graduate engineering school along the lines followed in teaching the navy classes for the past two years.

In the navy the need is even greater. When it is considered that a midshipman, during the four years of his academic life, is required to train himself in several distinct professions, while the college man in the same time fails to master even one of these, the handicap is evident. One simply cannot become a trained engineer under the circumstances. He can become familiar with the machinery employed, and is thoroughly capable, after watch-standing for instruction, of operating this machinery. But when he is called upon to design new apparatus, to change the operating plans for the old, or run careful tests on either the old or the new, he finds himself handicapped by lack of training. The average officer, confronted with such a problem, goes about preparing himself as best he can. He looks up the sources of information, and by hard study succeeds in finding a way out. This is personal post-graduate work, and in some cases is sufficient. In others it is not, for the simple reason that sources of information do not agree, and the student soon finds himself hopelessly lost. One has but to try

to solve a problem in design by means of that excellent hand-book by Kent, to appreciate this fact. One of the first things, then, which we lack is a knowledge of the sources of information and the ability to differentiate between the good and the bad.

Another important factor is that engineering is changing so rapidly that a man who confines his engineering experience to machinery at sea in ships cannot keep up with the changes. He may study, if he can find time between duties to do so, but studying machinery is not keeping up with it. As an example, one may easily conclude from reading one of the best turbine text-books that to lift a turbine casing it is simply necessary to assemble the men and gear and lift, "by the numbers." The absurdity of this is most apparent to the engineer who has spent weeks doing this same piece of work. Intimate personal contact with the latest type of machinery itself is the thing that makes an engineer capable of deciding whether there is a chance of its success in his own particular field. We have a great deal to learn from our brother engineer ashore. Many kinds of apparatus can be adapted bodily, while others can be used after modification. Certain methods of operation might be transplanted to advantage, yet the engineer who is doing the best he can in his own engine-room may never become familiar with these.

Of course, the original design of the ship is done in the department, but the question now becomes, Who are to constitute our future designers, when the present stock from the old engineer corps is exhausted? We may transplant a successful operator from his ship to the design office, yet we would not have a designer, because he would have to start in at the bottom and spend most of his tour of duty learning the details. The proper solution to this problem is obviously that which has been arrived at in the establishment of our schools.

We may summarize the necessities for post-graduate schools under the following heads: (a) to render the engineer familiar with the sources of information, (b) to produce the ability to differentiate between the good and the bad, (c) to keep the engineer in touch with the progress of engineering, (d) to broaden his knowledge by personal contact with other fields of engineering, (e) to train young men in the best manner to take the place of those men of the old engineer corps who as specialists stood foremost, not only in their own province of marine engineering, but

in the whole engineering world as well. It is considered significant that such an ambitious nation as Japan maintains the same system of post-graduate instruction at the University of Tokio as do we at Columbia University.

THE METHOD OF INSTRUCTION

In the remarks above, the word "engineering" has been used in a broad sense as applying to civil, mechanical, electrical and ordnance engineering. The officers assigned to this school at present are designated for the civil, ordnance and construction branches when assigned. Those for the other branches are simply ordered for duty and make the selection of their specialty after the first year's work. Those officers in the special branches spend a certain time in the classes of the regular students, after which they are assigned to certain institutions for instruction. The remarks here will be confined to the regular class, with which I am most familiar.

For this class, officers are detailed who have applied for the duty and are recommended after engineering duty afloat. The average man comes ashore after five years' service, in which time he has become more or less familiar with engineering as it exists in the fleets. The class of which I am a member contains eighteen students, of whom twelve were assigned in August, 1913. The other six reported in February of the following year, but since this plan has obvious disadvantages, it has been abandoned in favor of the one which makes all assignments in August. The class reported at Annapolis at the end of the third week in September, and each member was assigned a desk at headquarters on the third floor of the Steam Building. The year commenced at the same time the regular academic year opened, and the first studies pursued were intended to get the students back into the habit of concentrated mental effort.

The course in Mathematics covered a review of all the "math" studied in the regular course at the academy, with its particular application to engineering. Physics and Chemistry were handled as a review, but in much greater detail than before, with a large amount of laboratory work. In addition to the regular classes, Professor Lucke of Columbia University lectured weekly on the subject of Steam Power Plants, giving a general summary of the subject. Office hours were from 8 a. m. until 1 p. m., and from

2 p. m. until 4.30, and since there were but few study periods during these hours, and an enormous number of problems to solve daily, the evening study period at home averaged from 7 p. m. until midnight. A student had practically no time for any of the social life of the academy, but devoted himself constantly to his work.

The second term, beginning in February and lasting until June, was full of more advanced work. In Mathematics, Differential Equations, the Theory of Least Squares, Analytical Geometry and Applied Mechanics were covered in detail. The Physics course was changed to the study of Electrical Engineering, designed to lead up to work at Columbia University, in the second year. Experimental Engineering was handled by a laboratory course, and Thermodynamics was studied in preparation for the complete course at Columbia. The visiting lecturer was Professor Walter Rautenstrauch of Columbia, who handled the subject of Machine Design and Analysis by means of a series of lectures and problems, with particular reference to the machinery of one of the battleships. Each of these courses was very complete, and in addition, Dr. Lucke continued his classes at less frequent intervals. With a large number of problems and laboratory reports, the work was of greater volume than in the first term, but an increased capacity in the student made it possible to accomplish the results in about the same hours.

The term ended with final examinations, one each day of June Week, lasting practically all day. During the summer, the first twelve officers to be assigned spent the day at the experiment station, while the other six continued the work of their second term. At the experiment station several tests were under way, including a test for the award of coal contracts, so that the subject of Experimental Engineering could be studied at first hand, under excellent instruction from capable engineers. No study was attempted at night because of the intense heat of an Annapolis summer, and the fact that many had suffered physically from the strain of the winter's study.

September was spent in leave, and in transferring to New York City, where the class reported at the end of the third week in that month and began work immediately. Here the class divided into four sections, two in the Mechanical Engineering and two in the Electrical Engineering group. In the first group there were two

sections of six men each, one the Design section, the other the Shop Management section. In the second group there were four men specializing in Radio and two in general Electrical Engineering. These groups had some classes in common. For the first term the Mechanical group all studied Engineering Thermodynamics, Machine Design and Analysis, and Experimental Engineering. The only difference between the Shop and Design sections was that while the Design course included two courses in Electricity, one a lecture, the other a laboratory course, the shop course included the study of Scientific Management instead. In the electrical branch there were some courses in common, the chief difference being in the time assigned to Radio work. Here the classes were called at 9 a. m., as for the regular students, with an hour at noon for luncheon and closing time at 4.10 p. m. These hours were much more satisfactory than the extremely long ones at Annapolis, and were conducive to better work. Shortly after our arrival the faculty extended the privileges of their club house, and took advantage of other opportunities to make it pleasant for the class. The work, while different from that at Annapolis, was of such great volume as to require practically the same application.

Since the university closed for the Christmas holidays, work was suspended for ten days at this time. After the mid-year examinations, the second term began with Thermodynamics, Machine Design and Experimental Engineering continued, and in addition a course in Gas Power, both lecture and laboratory, was instituted for the Mechanical group. Practically the same division of studies existed as before, except that but one electrical course was taken by the design section, namely, the Application of Electrical Machinery. The term ended, after the final examinations, and on June 2 the class took part in the graduation exercises of the university and received the degree of Master of Arts for their post-graduate work. For the rest of the summer the class is attached to the New York Navy Yard, under instruction, for the purpose of observing the methods and machinery there, and at the same time visiting important plants in the vicinity which supply the navy with material. The Electrical section, as part of its summer course, is to work with the "trouble squad" of the New York Telephone Company.

The above remarks constitute a general description of the work. From this it is seen that the following objects were to be accom-

plished: (a) to first get the student back into the habit of studying, (b) to drill him by problem work in the different branches of both mathematics and engineering, so that he is capable of meeting any engineering problem intelligently, (c) to bring him into such intimate contact with all types of machinery and their actual operation that he becomes familiar with all their characteristics, (d) to so develop his powers of judgment and analysis that he can choose between the good and the bad on their merits, and (e) to familiarize him with the sources of information.

RESULTS ATTAINED

The individual who completes the course outlined above receives the most complete engineering education available to-day. To appreciate this fact, several points must be considered. The average midshipman is quite young, and is more or less interested, during his school days, in athletics and the social side of his life. He is often inclined to consider his studies a necessary evil, with less idea of using the knowledge he gains for practical purposes than in passing the next examination. After graduation, however, he changes his viewpoints in many ways, and by the time he has spent five years afloat, he begins to appreciate the value of engineering knowledge, especially if he has ordnance or engineering duty. When he undertakes post-graduate work he does so with an idea of its practical application, and as a result knows what he needs and carries it away with him. It is well known that the system of instruction at the Naval Academy is quite different from that in vogue in most universities. There is practically no lecturing or instruction in the academic work, and the midshipman must dig his information out of the books himself. The system of marking and examining leads to the development of a memory almost photographic, but at the same time, if he be not naturally endowed with good reasoning powers, he is not likely to have them when he graduates. In the universities, on the other hand, one is taught to remember nothing as a feat of memory, but to know where he can get any information when he wants it, and if he can't find it, to reason it out for himself. The instructor marks the student on his ability to substantiate an assertion by argument, even though he does not agree with the student's viewpoint. Obviously this method neglects the memory, and there is no doubt of its disad-

vantages. However, the student who is fortunate enough to study under both systems at a time when he is mature enough to realize the advantages of each must be considered fortunate. This, then, is the chief gain to the individual: excellent mental and manual training.

More important, of course, is the gain to the service, and this gain is chiefly that of a number of well-trained men. Whether the men can avail themselves of their training is a matter of personality, but they leave the school and return to the service with a broader viewpoint, better engineering judgment, and greater manual skill, but, greatest of all, the foundation and training with which to attack any problem and to accomplish its logical solution. The study of engineering is most stimulating for the reason that it is full to overflowing with problems that await the attack of an alert, well-trained mind for their solution. Four or five such problems are being studied by different officers of the several classes to-day, and some of them that have baffled others for years seem near solution as a result of their efforts. Two members of the class finishing this year have been experimenting on ideas adapted from shore practice, with the result that they seem likely to solve some difficult problems aboard ship. The solution of such problems is important not only to the service, but to the whole engineering world as well, and their completion by the navy reflects credit on the service.

In conclusion, then, we may say that there is an urgent need of post-graduate work to maintain the standard of engineering in the navy, and to keep it in the forefront, as was accomplished by such men as Admiral Melville; that the present method of conducting the work is a good one, and far superior to the first engineering school method; and that such work is of great value, not only to the service, but to the whole engineering profession as well.

COMMENT ON LIEUTENANT WILSON'S ARTICLE ON THE POST-GRADUATE COURSE[1]

By CAPTAIN L. H. CHANDLER, U. S. Navy

Lieutenant Wilson's paper is, in my opinion, a most timely one, and should give to the officers of the navy information that they have heretofore been unable to obtain. I believe it will do much towards clearing

[1] Captain Chandler was, at the time the article was written, head of the P. G. School.

up many misapprehensions that now exist and to the elimination of much unfavorable, and, be it said, mostly uninformed criticism.

The amalgamation of the old line and engineer corps, together with the great advances made in all mechanical branches during the last 25 years, have largely increased the amount of ground to be covered in the instruction of undergraduate midshipmen, but the length of time available for instruction has not been increased. As a result of this it has been found necessary to eliminate from the undergraduate course many subjects and parts of subjects that were formerly studied. The attempt has been made to eliminate from the academic course all purely theoretical subjects, and as a result the academy turns out officers as well qualified for their practical duties as it is possible to make them, but who have comparatively little of the theoretical knowledge necessary to make their education complete. As an example may be mentioned the fact that, although graduates are supposed to have a practical knowledge of the construction and operation of steam machinery, yet they have really been taught nothing in regard to the fundamental principles governing the design of such machinery, that is of Thermodynamics and machinery design.

Now a knowledge of such matters is necessary to make a competent, all around officer, and all officers should have a working knowledge of the general principles involved, though not necessarily of all the detailed methods of professional designers.

The first need that became apparent in this connection was for a limited number of officers capable of gradually taking over design, construction, and inspection work in all branches. The system of post-graduate instruction was therefore inaugurated, and has at this date settled down to the course so clearly described by Lieutenant Wilson, whereby a certain number of specially selected officers are each year trained for the performance of the particular duties in question.

The school is, however, still in the early stages of development. In the past there were doubtless mistakes made in the character and details of the courses to be taken, and there are doubtless many things at present that need adjustment. My point is that the school is as yet young, and that it was a difficult thing to start correctly, but that a steady and gratifying improvement has been shown throughout the years of its existence, and that a continuation of this improvement may be confidently expected, provided we all put our shoulders to the wheel and push together, both those in charge and the student officers alike.

I have already stated that in my opinion the present day graduate of the Naval Academy does not know enough about theoretical matters to make him a thoroughly well-grounded officer. To overcome this fault it is my hope ultimately to see every officer of the navy take the post-graduate course before he finishes his service as a lieutenant (junior grade). Such officers should come to the school in one or the other of two classes, namely:

CLASS 1.—The comparatively few specially selected men who are to actually become practical designers. These should follow courses much

as at present, extended and made better if possible, and having in mind the special purpose for which each man is being educated.

CLASS 2.—All other officers. These should be given a general course in the nature of a "finishing school" course. This should include the things that they ought to know but which were necessarily insufficiently taught, or not taught at all, during their undergraduate course; these things being a proper, useful, working education in Mathematics, Thermodynamics, Electrical theory, Mathematical theory of Deviation of the Compass, Exterior and Interior Ballistics, elastic strength of guns, etc.; with perhaps modern languages and naval and strategic history.

In a word, I hope to see the Post-Graduate Department become a general university for officers of the Navy, whereby each man may perfect himself in general in all branches of his profession, and in particular in those in which he wishes to specialize. That there is a wide field for such a university and that the officers of the navy as a body would be quick to take advantage of it, is my firm belief.

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SUPERDREADNOUGHTS AND SUPERMEN

By CAPTAIN T. W. KINKAID, U. S. Navy

The steady progress that is being made in warship design and construction in the United States must be gratifying to every citizen. The hulls, the machinery, the ordnance, and the numerous items of equipment all show advance over previous constructions.

As to the size of these ships, nearly every boy in the country knows that the United States usually has the biggest warship in the world. It would appear not improbable that before long we shall have a 50,000-ton battleship.

Then there are the numerous auxiliaries, the destroyers, the submarines, scouts, gunboats, fuel-ships, transports, tenders, minelayers, and so on. Each successive year witnesses an advance in design, and usually increased speed of construction.

So great is the potency of individual vessels of all of the fighting types, and of divisions and fleets, that the burden of responsibility which in these days rests on the shoulders of the commander and his subordinates is at times almost appalling. The destiny of a nation may depend upon the proper handling of the main fleet; and the success of the main fleet may depend upon the maneuvering of a minor fleet; and so on down to the humblest command.

It is thus seen that, unless a nation can and does maintain a fleet of overwhelming size as compared to that of any other nation, it must pay extraordinary regard to both matériel and personnel of the fleet which it actually possesses.

In our own country the opinion appears to prevail that we shall never stand higher than second or third among the naval powers. This rating, of course, is made on the basis of size alone, and contemplates chiefly the matériel.

So it seems plain enough that we of the United States should strive to the utmost to secure such a quality of personnel and matériel in our naval service as to make the world assign to us a coefficient that will attest recognition of superiority.

How is such a desirable condition to be attained?

I have expressed an opinion as to the high quality of our matériel. But I have not committed myself to the opinion that a still higher standard cannot and should not be attained.

Indeed, it seems self-evident that if we improve our already good personnel to that point of excellence which is imperative, then a considerable improvement in the matériel will naturally follow.

The personnel should be taken to include commissioned officers of the line, and of the various staff corps, the warrant officers, petty officers and the non-rated enlisted men, and the navy yard forces.

For the purposes of this brief paper I am going to confine myself to consideration of the commissioned line officers.

As is well known, each senator and representative in Congress is allowed to maintain two midshipmen at the naval academy. There are also a few appointments at large; and provision has recently been made for the appointment of a number of young men annually from the enlisted force of the navy.

Some of the senators and representatives assign their appointments to the winners of competitive examinations, the competitions being open to such young men as may be designated by the appointing authority. But, as a rule, the appointment is bestowed outright. However the appointments of midshipmen may be made, it happens that a certain proportion of each graduating class is composed of bright young men, who are more or less adapted for the naval service, while the remaining members of the class vary in capability from good to ordinary.

Opinions differ as to the advisability of making the entrance examinations more difficult or easier than they are now, and as to whether the candidates should be older or younger than they are at present.

Doubtless the majority of naval officers agree as to the undesirability of lowering the mental standard of admission; and I believe also that the present age limits, 16 to 20 years, are considered satisfactory by most officers.

One question that bobs up perennially is that of waiving physical defects. These would hardly ever be waived except through influences outside of the navy itself. Of course waiving physical requirements practically assures an increased retired list.

Now let us ask ourselves the question: Is the present system of appointment of midshipmen the best system possible? Is it the one that is bound to give us the best results; the best officers for the best ships?

I believe that the correct answer is "No."

The present system produces fair results. Some of the young men who come to the academy as midshipmen are bright, some are of good intellectual quality, and some are of a quality that can perhaps be designated as "fair." Some of them have superb physiques, some are only "fair to good" in bodily qualities, and some are headed for the retired list. Some possess a high degree of aptitude for the naval service, if not the spark of genius, and will make excellent officers; some are destined to make good naval officers; and some, because nature intended them for other roles, will never rise above mediocrity as naval officers.

It would appear that, if only the best is good enough for our naval service, a decidedly improved system of appointment of midshipmen should be established. In a country with a population of approximately one hundred millions, it is surely possible to gather a couple of hundred lads between the ages of 16 and 20 each year who possess fine physiques, fine mental qualities, excellent characters, and a high degree of aptitude for naval life.

Why not abolish the present system of appointment, which tempts the appointing authority to use this power to pay political debts, and which, in any event, produces only results which average not better than "good," and substitute a system of appointment which will throw the whole burden upon the individual states?

The present system has the good characteristic of placing in the naval academy representatives of all parts of the country; the proposed system would preserve that feature.

Apportion the appointments among the several states as the representatives and senators are apportioned. Let the government of each state settle in its own way which young men of the lawful age it will send as its representatives at the academy.

At first glance the new scheme appears to invite the machinations of politicians; but further consideration will, I think, convince us that when the representatives of one state at the academy have a higher standing than those of another state, the latter state will be incited automatically to increase the standard of its appointees.

Were the proposed system adopted, I do not doubt that each state would throw the competition for midshipmen appointments open to every schoolboy of suitable age within its boundaries. The newspapers would see that the competition would be fair; and the points of merit of the successful candidates would be heralded from one end of the state to another.

I do not doubt that this system would give us a practically "all star" entering class, at least as far as mental and physical characteristics are concerned. The moral characters of the matriculates would doubtless be good, if not uniformly excellent.

As to aptitude for the naval service, I see no means of determining this quality except at the academy itself. Besides the ordinary means of determining aptitude, as at present employed, it may be that the comparatively new science of character analysis by the observational method, which is said to be employed at certain large industrial establishments, would be of great assistance; but this at least seems certain: the aptitude of the growing midshipman should be one of the chief concerns of his instructors.

It may be thought that an objection to the proposed scheme would lie in a tendency to send to the naval academy too great a proportion of young men of the "high brow," or mental, type. But I believe that a natural check would operate. The illustrated press of the country, weekly and monthly, now keeps the nation so well informed as to the matériel of the navy and of many of its operations that the average boy in almost any section is fairly well posted on many of the essentials of a naval officer's life; and I believe that the young men to whom the naval life would naturally appeal would be the ones that would apply for the competitive examinations.

Hence I should expect that the predominant temperamental constitution of the new midshipmen would be motive-mental-vital or mental-motive-vital, rather than vital-motive-mental or any other combination. In Nelson, Howe, Hood, John Paul Jones,

Farragut, and other great naval captains the facial characteristics were such as can be predicated of all great military leaders.

I might mention also that, in spite of Kipling's famous verses on "The Female of the Species," it is probably not good policy to encourage the acquisition of men of distinctly feminine characteristics.

It must be admitted, of course, that it would probably be disadvantageous to have all officers cast in the same mold. I believe that the best all-around officer is the one with the mental and motive temperaments well in evidence and about evenly balanced, with the vital temperament not too glaringly deficient, a case that was exemplified in Sir George Rooke. It is well to have a few officers, like Mahan, for example, with the mental temperament predominant.

Under a system as proposed I should expect some midshipmen to be dropped for inaptitude, but not many for mental, moral or physical defects.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

THE SHIPS OF THE UNITED STATES NAVY

AN HISTORICAL RECORD OF THOSE NOW IN SERVICE AND OF THEIR PREDECESSORS OF THE SAME NAME

1776-1915

By ROBERT W. NEESER

KANSAS

KANSAS.—One of the United States, on the prairie between the Mississippi River and the Rocky Mountains. It was part of the Louisiana Purchase; and was admitted into the Union in 1861.

The battleship *Kansas* is the second ship to be named after the Sunflower State. She was authorized by the Act of Congress approved March 3, 1903, and was built by the New York Shipbuilding Company at Camden, N. J., where she was launched on August 12, 1905, her contract price being $4,165,000. Her general dimensions are: length, 450 feet; breadth, 76 feet 10 inches; draft, 24 feet 6 inches, and displacement, 16,000 tons. The engines are of the vertical, twin-screw, four-cylinder, triple-expansion type, of a combined indicated horse power of 19,957. There are 16 Babcock and Wilcox boilers. Her speed on trial was 18.09 knots. She carries a crew of 41 officers and 809 men.

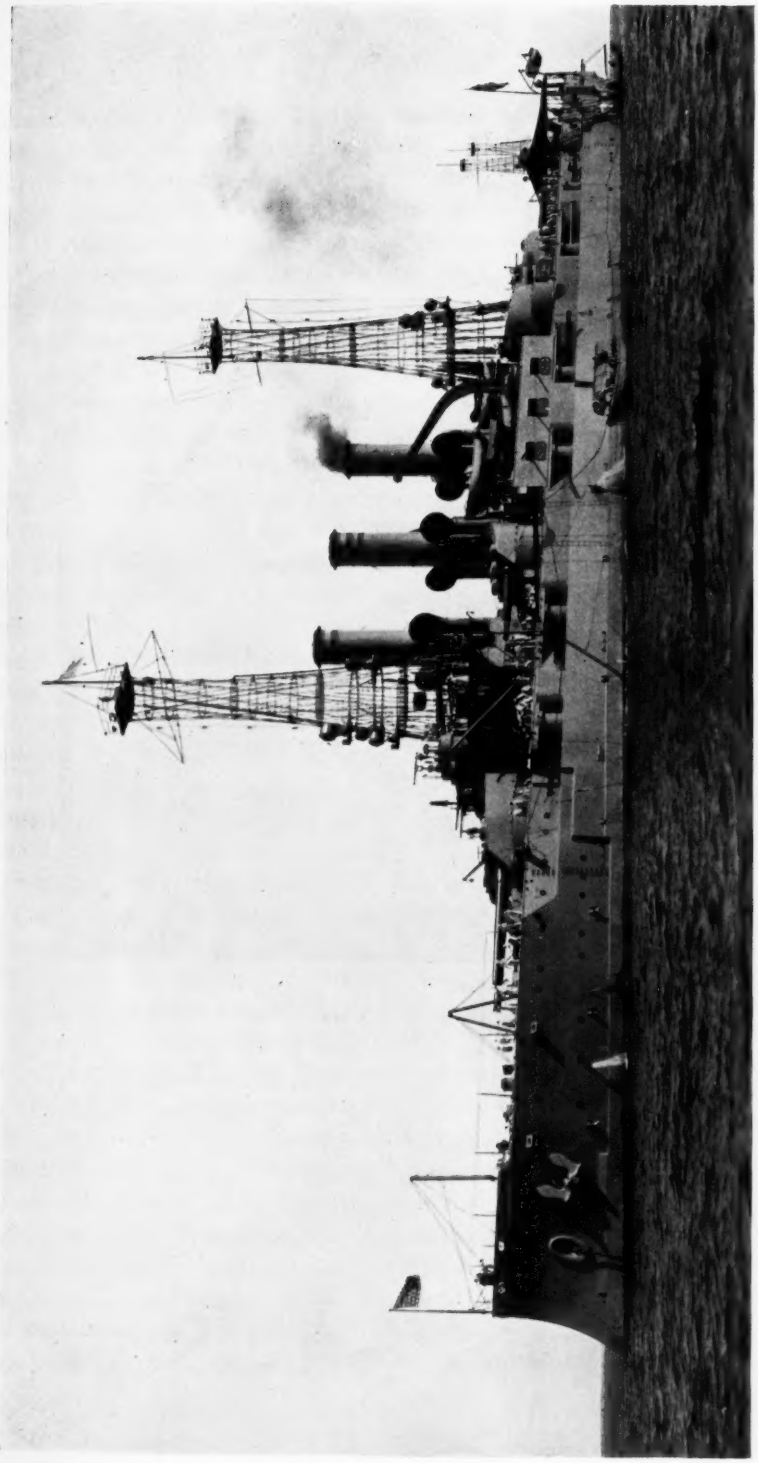
The main battery consists of four 12-inch B. L. R.'s, eight 8-inch B. L. R.'s and twelve 7-inch B. L. R.'s, while the secondary battery includes twenty 3-inch 14-pounder R. F. guns. There are four submerged torpedo tubes, and the usual boat guns and field pieces. The 12-inch guns are mounted in pairs in two elliptical turrets on the center line, one forward and one aft, and the 8-inch guns in pairs in four turrets, two on the beam at each end of the superstructure. The 7-inch guns are mounted in broadside on the gun deck behind 7-inch armor. The hull of the vessel is protected at the water line by a complete belt of armor 9 feet 3 inches wide, having a maximum thickness of 9 inches for about 280 feet amid-

ships. The 12-inch barbettes extend from the protective deck to about 4 feet above the main deck and consist of 10 inches of armor in front and 7½ inches in the rear above the gun deck. The 12-inch turrets have a front plate 12 inches thick, rear plates 8 inches thick, and top plates 2½ inches thick, while the 8-inch turrets have armor varying in thickness from 6½ to 2 inches.

The *Kansas* was placed in service at the League Island Navy Yard on April 18, 1907, by Captain Charles E. Vreeland, and left on her first cruise on August 17. In December she sailed from Hampton Roads with the Atlantic fleet on the cruise around the world, returning to Philadelphia on February 28, 1909, for repairs and overhaul. On April 20, 1909, Captain Vreeland was relieved by Lieut. Commander Philip Andrews, who, in turn, was succeeded by Captain Walter C. Cowles (April 30, 1909), and Lieut. Commander William C. Cole (May 31, 1909). Under Captain Charles J. Badger (June 14, 1909) the *Kansas* made a three years' cruise with the Atlantic fleet, leaving Philadelphia on June 17, 1909, and finally putting into Hampton Roads on April 11, 1911, where Captain John A. Hoogewerff, on April 19, 1911, relieved Captain Badger. The *Kansas* formed part of the second division of the battleship fleet for the next few years, and with it made a cruise to France and England in the fall of 1910 and to the Baltic Sea in the summer of 1911. Captain William B. Fletcher took command of the ship on May 30, 1913, and under him the *Kansas* performed duty in Mexican waters from December 23, 1913, to February 2, 1914. In the spring of 1914 there followed a period of general overhaul, after which the ship again put to sea, under Captain Henry F. Bryan (May 19, 1914) for service with the fleet.

The first *Kansas* was a screw steamer built by the government during the Civil War at the Philadelphia Navy Yard. She was a vessel of the fourth rate. Her cost of construction was $212,316.78, and she was launched on September 29, 1863. Her principal dimensions were: length, 179 feet 6 inches; breadth, 30 feet; depth of hold, 12 feet 9 inches; draft, 10 feet 6 inches; tonnage (old measurement), 593 tons, and displacement, 836 tons. She was built of wood, and was brigantine-rigged. Her crew consisted of 108 men.

The machinery of the *Kansas* was taken from the prize steamer *Princess Royal,* and consisted of two horizontal, direct-acting, two-



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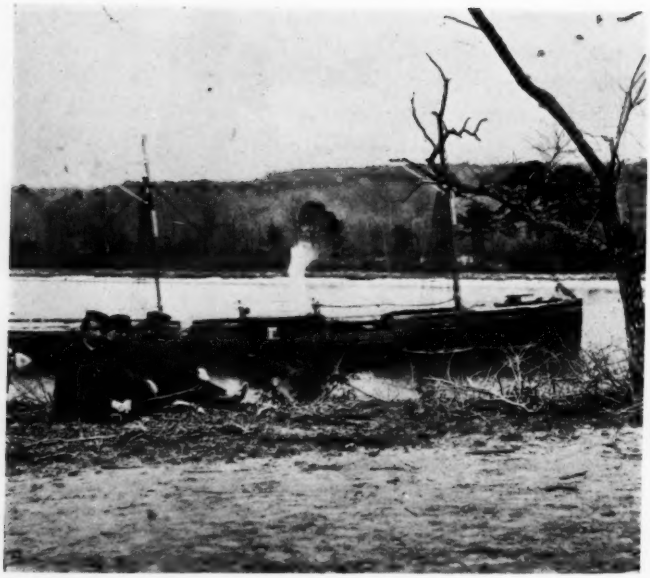


U. S. Gunboat "Kansas," James River, Va.

Taken from Photographic History of the Civil War,
Review of Reviews Co., Pubs. Copyright, 1911, by Patriot Pub. Co.

cylinder engines, of 24 inches stroke, and two condensing, straight-way boilers. Her speed was 8 knots. The armament of the *Kansas* was altered on a number of occasions. On January 20, 1864, she carried one 150-pounder Parrott rifle, one 30-pounder Parrott, two 20-pounder Dahlgren rifles, two 9-inch smoothbores, and two howitzers. On September 26, 1864, a 100-pounder Parrott was substituted for the 150-pounder gun, and this, on March 31, 1865, was supplanted by an 11-inch smoothbore. On September 30, 1865, another light 12-pounder was added. In August, 1870, the *Kansas'* battery included one 11-inch smoothbore, two 9-inch guns, one 20-pounder Parrott, and one howitzer.

The *Kansas* was commissioned at Philadelphia on December 21, 1863, by Lieut. Commander Pendleton G. Watmough, and sailed six days later to join the North Atlantic blockading squadron. She was delayed some time at Hampton Roads on account of trouble with her engines, but in March, 1864, she was mentioned as being on the blockade off New Inlet, N. C. From this time on the *Kansas* was active on the blockade as an "outside cruiser." On May 6, 1864, she participated in the capture of the *Young Republic;* on May 7 she engaged the Confederate ironclad ram *Raleigh* off New Inlet; on May 15 she intercepted the British blockade runner *Tristram Shandy*. During the first attack upon Fort Fisher on December 24 and 25, 1864, the *Kansas* fired 577 shots, and in the course of the second attack, on January 13-15, 1865, she expended 488 rounds of time and percussion shell, while she had one man wounded in the land attack. After the fall of Fort Fisher the *Kansas* was ordered to Smithville, N. C., and later to the James River (May, 1865), where she was stationed until the close of hostilities. She returned to Philadelphia on April 23, 1865, and was placed out of commission on May 4.

On July 28, 1865, the *Kansas* was again placed in service and attached, under Lieut. Commander C. H. Wells, to the Gulf squadron. In January, 1867, she was transferred to the South Atlantic squadron and made a cruise to the West Coast of Africa in search of possible slavers. Later she was engaged in protecting American interests in South America. Her commanding officers during this period were: Lieut. Commander C. L. Huntington (August 3, 1867), Lieut. Commander W. H. Dana (September 14, 1867), Lieut. Commander Henry Erben (July 25, 1868), Lieutenant W. K. Wheeler (Oct. 24, 1868), Lieut. Commander H. B. Seely

(December 13, 1868), and Commander Henry Erben (March 29, 1869). The *Kansas* returned to the navy yard at Washington, D. C., on September 15, 1869, and was placed in ordinary on September 22, 1869.

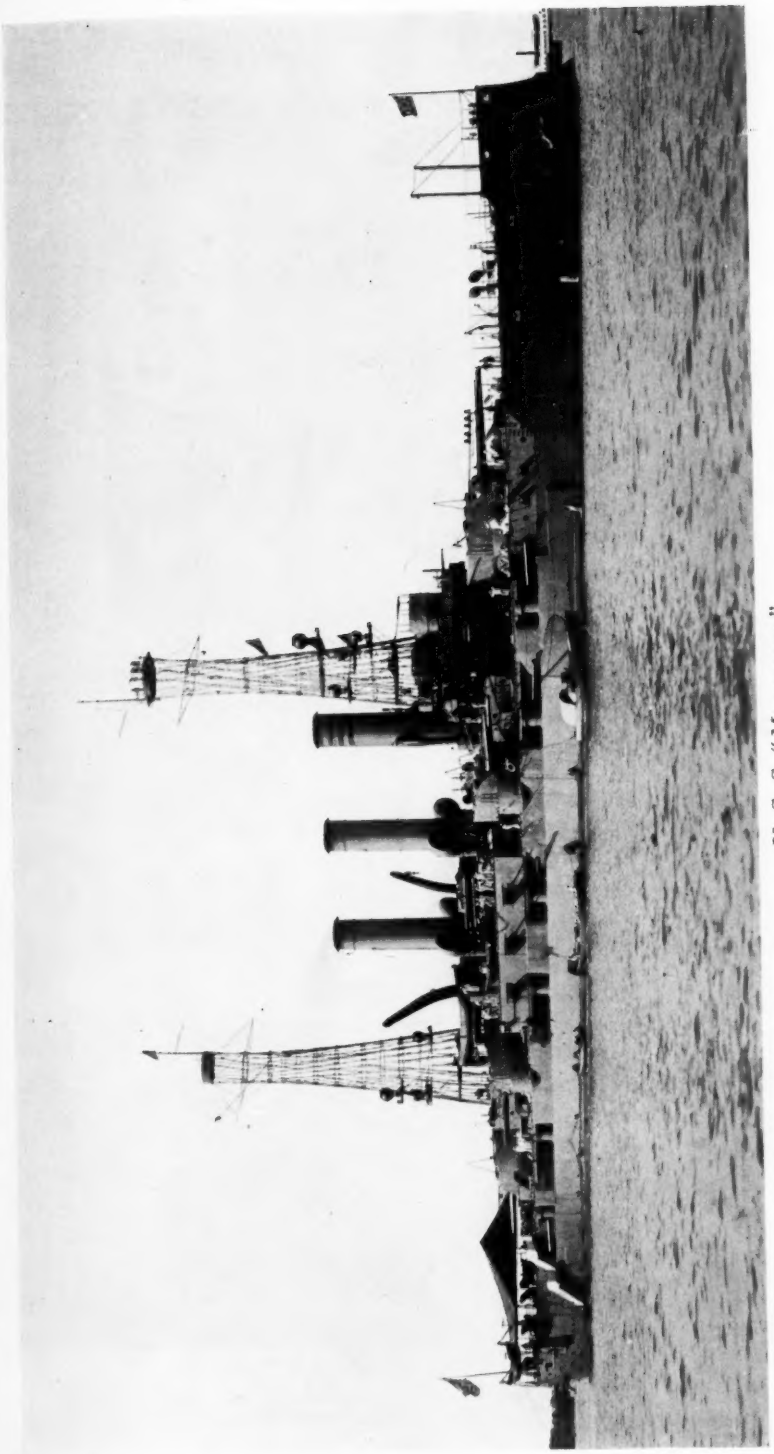
From 1870 to 1875 the *Kansas* was again at sea, on special service, with the Tehuantepec and Nicaragua Surveying Expedition. She sailed from Washington on October 10, 1870, and cruised between Greytown and Key West. Her commanding officers were: Lieut. Commander N. H. Farquhar (September 26, 1870), Commander Chester Hatfield (June 20, 1871), Commander Edwin White (April 16, 1872), Commander Chester Hatfield (July 4, 1872), Commander Edwin White (July 30, 1872), Commander Allen V. Reed (August 14, 1872), Lieut. Commander Alfred Hopkins (June 20, 1874), and Commander R. S. McCook (April 10, 1875). The *Kansas* was finally ordered to Portsmouth, N. H., where she arrived on August 4, 1875. She was placed out of commission six days later, and was sold on September 27, 1883, to I. L. Snow, at Rockland, Me., for $7,000.

MINNESOTA

MINNESOTA.—One of the United States. Originally part of the French colony of Louisiana, it was ceded to the United States in 1803. The first American settlement was established at Fort Snelling in 1819. In 1858 Minnesota was admitted into the Union as a state.

The battleship *Minnesota* was the second ship of our navy to bear the name of the Gopher State. She was authorized by the Act of Congress approved March 3, 1903, and was launched at the yards of the Newport News Shipbuilding Company, Virginia, on April 8, 1905. Her general dimensions are: length, 450 feet; breadth, 76 feet 10 inches; draft, 24 feet 6 inches; displacement, 16,000 tons. Her propelling machinery consists of two sets of vertical, triple-expansion engines, for which steam is furnished by 12 Babcock and Wilcox boilers. Her speed on trial was 18.85 knots. The *Minnesota* cost $4,110,000. Her complement included 41 officers and 840 men.

The armament of the *Minnesota* includes four 12-inch B. L. R.'s mounted in pairs in two turrets forward and aft, eight 8-inch B. L. R.'s placed in four turrets, two on each beam, and twelve 7-inch rapid fire guns on the gun deck in casemates. Her secondary battery comprises twenty 3-inch guns, twelve 3-pounders, and



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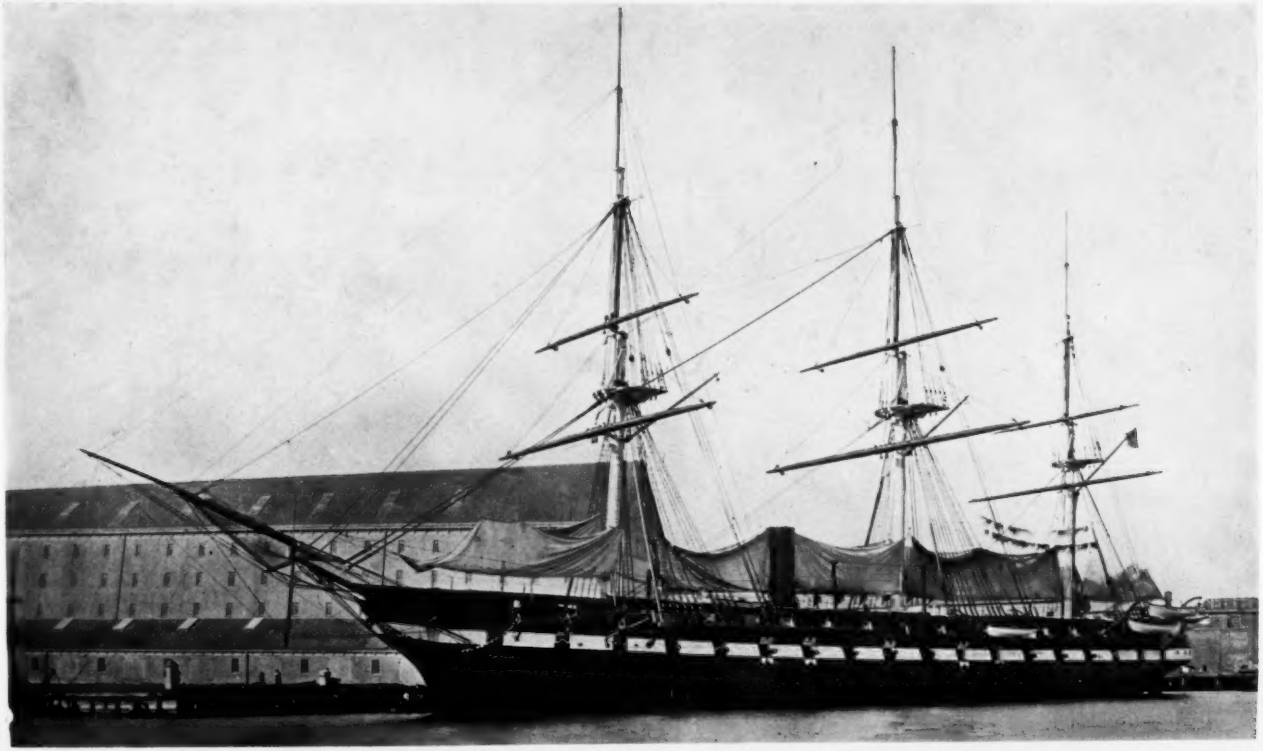


U. S. S. "MINNESOTA"

the usual field pieces and boat guns. There are also four 21-inch torpedo tubes. The armor protection for the turrets varies from 12 to 6½ inches in thickness, and that of the barbettes from 10 to 4 inches in thickness, while there is a water-line belt of 9 inches of steel, and a steel protective deck tapering from 3 to 1½ inches.

The *Minnesota* was placed in service at Norfolk by Captain John Hubbard on March 9, 1907, and sailed on her first cruise on April 7. During the spring and summer of 1907 she was on duty connected with the Jamestown Exposition, after which she joined the Atlantic fleet and took part in the cruise around the world in 1907-1909. On her return, in February, 1909, the *Minnesota* was ordered to Norfolk for repairs. On March 1, 1909, Commander William S. Sims relieved Captain Hubbard, and a few months later the *Minnesota* again left port to rejoin the fleet. From June 7 to 22, 1912, she was stationed at Guantanamo, Cuba, on duty in connection with the Cuban rebellion. In October, 1912, she was present at the naval review held at New York. From January to August, 1914, she was in Mexican waters. Her commanding officers during this period were: Captain G. R. Clark (April 19, 1911), Captain Edward Simpson (November 12, 1912), and Captain Casey B. Morgan (November 24, 1914).

The first *Minnesota* was a screw frigate of the first rate, of 4700 tons displacement. She was authorized by the Act of April 6, 1854, and she was launched on December 1, 1855, at the Washington Navy Yard. Her principal dimensions were: length, 264 feet 8½ inches; breadth, 51 feet 4 inches; draft, 23 feet; tonnage (old measurement), 3307 tons. She had two horizontal engines of 1000 h. p., and two Martin tubular boilers. Her speed was 9.25 knots. Her cost of construction was $691,408.14. She carried a crew of 540 men.

The armament of the *Minnesota* was changed many times during the Civil War. Her original battery consisted of one 10-inch smoothbore, twenty-six 9-inch guns, and fourteen 8-inch shell guns. On May 2, 1861, two 9-inch guns were added; eight days later four howitzers were mounted; while on December 27, 1862, the following battery was assigned: One 110-pounder gun, one 200-pounder Parrott rifle, four 100-pounder Parrotts, and thirty-six 9-inch smoothbores. In April, 1863, there were one 150-pounder Parrott rifle, two 100-pounders, one 11-inch shell gun,

and twenty-one 9-inch smoothbores. Later in the year two more 100-pounders, seventeen 9-inch guns and four howitzers were mounted in addition to this battery. On May 26, 1864, the *Minnesota* is credited with one 150-pounder, one 11-inch gun, and eighteen 9-inch shell guns. This armament was, on October 12, 1864, increased by twenty 9-inch guns, one 100-pounder rifle and four howitzers. After the war, in June, 1867, the *Minnesota* carried one 11-inch smoothbore, forty 9-inch guns, two 60-pounder rifles and four 12-pounder howitzers. In January, 1874, her battery consisted of two 11-inch smoothbores, forty-two 9-inch guns, two 100-pounder rifles and two howitzers; in June, 1875, there were twenty-six 9-inch smoothbores, four 32-pounders of 45 cwt., one 11-inch smoothbore and two howitzers; in April, 1878, she carried twelve additional 9-inch guns and two 20-pounder B. L. R.'s; in December, 1879, she was assigned twenty-four 9-inch smoothbores, sixteen 32-pounders, two 20-pounder B. L. R.'s, and ten pieces of smaller caliber; in April, 1882, she had one 60-pounder B. L. R., twenty-four 9-inch smoothbores, two 20-pounder B. L. R.'s, and four smaller guns.

The *Minnesota* made her maiden cruise in the East Indies under Captain S. F. Du Pont (May 21, 1857). She sailed from Philadelphia on May 28, 1857, with the Hon. William B. Read, United States Envoy Extraordinary and Minister Plenipotentiary to China, as passenger. After visiting the principal ports of China and Japan with the squadron, she left the station early in 1859, and on her passage home stopped at Bombay, where she was visited by the governor and by the commander-in-chief of the army and navy of West India, and at Muscat, where the visit of the *Minnesota* caused so much gratification to the Sultan—she was the largest vessel of war that had yet visited him in his dominion—that he offered to present Captain Du Pont with an Arabian steed and a jewelled sword. On her return to Boston, on June 2, 1859, the *Minnesota* was placed out of commission.

On the outbreak of the Civil War, Flag Officer S. H. Stringham was ordered to hoist his broad pennant on board the *Minnesota* as flagship of the Atlantic blockading squadron. The ship was accordingly placed in commission on May 2, 1861, by Captain G. J. Van Brunt, and on the 8th she left Boston for Hampton Roads, Va., where she arrived after a moderate passage, and immediately established the blockade. While in these waters sev-

eral prizes were captured and the activities of the Confederate vessels considerably interfered with.

The importance of extending the operations of the Union blockading fleets farther south, in order to close more effectively the main inlets through which blockade runners and smugglers glided, laden one way with the products of English workshops, and the other with cotton, led to the fitting out of a squadron under Flag Officer Stringham for the purpose of forcing the Confederate position at Hatteras Inlet, N. C. Here two important works had been erected, Fort Hatteras, mounting 20 guns, and Fort Clark, on the opposite side of the bay, with five guns. "It was the first important experiment of the war in engaging earthworks with ships," says Professor Boynton, "and the result was awaited with no small anxiety by those who had planned the expedition. At 8.45 on the morning of August 28, 1861, the *Wabash* got under way, and, with the *Cumberland* in tow, led in toward Fort Clark, the *Minnesota* following them. The heavy frigates were watched with intense interest as they steamed on toward positions within range of the forts, and at 10 a. m. the jets of smoke leaping from every port of the broadside, and the deep roar that came rolling over the waves, announced that the fight had begun. Ten minutes later the *Minnesota*, having passed inside the *Wabash*, took a position nearer to the forts and opened upon them with her mighty battery. Nine-inch, 10-inch and 11-inch shells burst over, around and in the fort so thickly that the gunners could take no steady aim, and were often driven from their guns." Shortly after noon the Confederates abandoned Fort Clark. On the next day the fire of the ships was concentrated on Fort Hatteras. The range was two miles, and the 15-second fuses exploded the shells perfectly. The garrison was forced to take shelter in the bombproofs. But even there the men were not safe, for a shell struck a ventilator and went through, spreading consternation among the 300 soldiers that were packed within. Further resistance meant only a useless sacrifice of life. So the white flag was run up over the fort, and the works were surrendered to the navy.

After the battle the *Minnesota* returned to Hampton Roads, where she maintained her station unchallenged throughout the fall and winter. In the spring of 1862, however, an event occurred which was destined to revolutionize naval warfare. In one hour the "mighty battery" of the proud frigate was "rendered use-

less." For on March 8, 1862, the much-heralded "iron-plated steam battery *Merrimac*" made her appearance and, in six hours, sunk one frigate, set fire to another, and caused three others to run aground. "I fired upon the *Merrimac* with my pivot 10-inch gun without apparent effect," wrote Captain Van Brunt. "The tremendous firing of my broadside guns crowded me farther upon the mud bank, into which the ship seemed to have made for herself a cradle. At 2 a. m. the iron battery *Monitor,* Commander John L. Worden, came alongside and reported for duty, and then all on board felt that we had a friend that would stand by us in our hour of trial." The next day the *Merrimac* returned to complete the destruction of the wooden fleet. But the *Monitor* ran out to meet her and fired gun after gun, "which was returned with whole broadsides from the rebels with no more effect, apparently, than so many pebblestones thrown by a child. The *Merrimac,* finding that she could make nothing of the *Monitor,* turned her attention once more to me. I opened upon her with all my broadside guns and 10-inch pivot, a broadside which would have blown out of the water any timber-built ship in the world." But the little *Monitor* once more placed herself between the *Minnesota* and her terrible antagonist, and compelled her to change her position.

On March 10 the Assistant Secretary of the Navy wrote: "The *Minnesota* is now getting ready for sea; she is no use here." But by the following day it was reported that, "by the great exertions of her people, she was again in condition for fighting, with her steam power uninjured," with Captain Dahlgren proposing that she "should have all her masts and spars out of the way except the lower yards, from which shells should be dropped into the funnel of the *Merrimac* if they come in contact." Once more the Confederate ironclad made her appearance, but she withdrew without coming to close quarters, and shortly after was destroyed by her own crew to prevent her capture by the Union troops that were threatening Norfolk from the rear.

After a brief visit to the recaptured navy yard at Norfolk, the *Minnesota* returned to Newport News, Va. There she remained as flagship of Rear Admiral S. P. Lee until October 20, 1862, when her commanding officer, Commander N. B. Harrison (September 30, 1862), received orders to proceed north for docking and for a change of battery. Besides, there was the question of liberty for her crew, which "the fleet surgeon verbally and

earnestly represented was necessary" after their arduous service of the past 16 months.

In March, 1863, the *Minnesota* rejoined the squadron at Hampton Roads and Admiral Lee transferred his flag to her. "This is the only man-of-war in this squadron," wrote the admiral, "with cabin accommodations for more than her commander. Hence the detail of this vessel for the blockade of Wilmington necessarily makes like disposition of me." So when the ship was ordered to reinforce the vessels stationed off Cape Fear, the admiral went along too. But it was not for long. Within two months the *Minnesota* was back in Hampton Roads as "stationary flagship," the admiral's mind was again at rest on the subject, and the ship's company were attending to their duties under the direction of Lieut. Commander J. H. Upshur, who, on December 9, 1863, had relieved Commander Harrison in command. The Confederates, however, were determined to interrupt the peaceful scene. Early in the morning of April 9, 1864, they sent the torpedo boat *Squib* to make an attack upon the flagship. A charge was exploded, and the "David" made her escape, but the *Minnesota* was not seriously injured and was able to maintain her station.

Under Commodore Joseph Lanman (September 30, 1864), the *Minnesota* participated in the two attacks upon Fort Fisher at the entrance of the Cape Fear River, North Carolina. During the first attack, December 24 and 25, 1864, the ship occupied a station one mile from the fort and her rapid firing was "of the most terrific character," while on January 15, 1865, she contributed 240 officers and men to the assaulting party and covered their advance with a heavy fire from her powerful battery. After this, Commodore Lanman was ordered to assume charge of the naval force in Hampton Roads, and later directed to proceed to Portsmouth, N. H., where he arrived on February 9, 1865, and on the 16th placed the *Minnesota* out of commission.

On June 3, 1867, the *Minnesota* was again placed in service under Commodore James Alden, and made a cruise to Europe with the midshipmen from the Naval Academy. Upon the completion of this special service she was placed in ordinary at New York on January 31, 1868. On June 12, 1875, she was again commissioned at the New York Navy Yard, where she was maintained until October 8, 1895, as gunnery ship and training ship for apprentices. Her commanding officers during this period were:

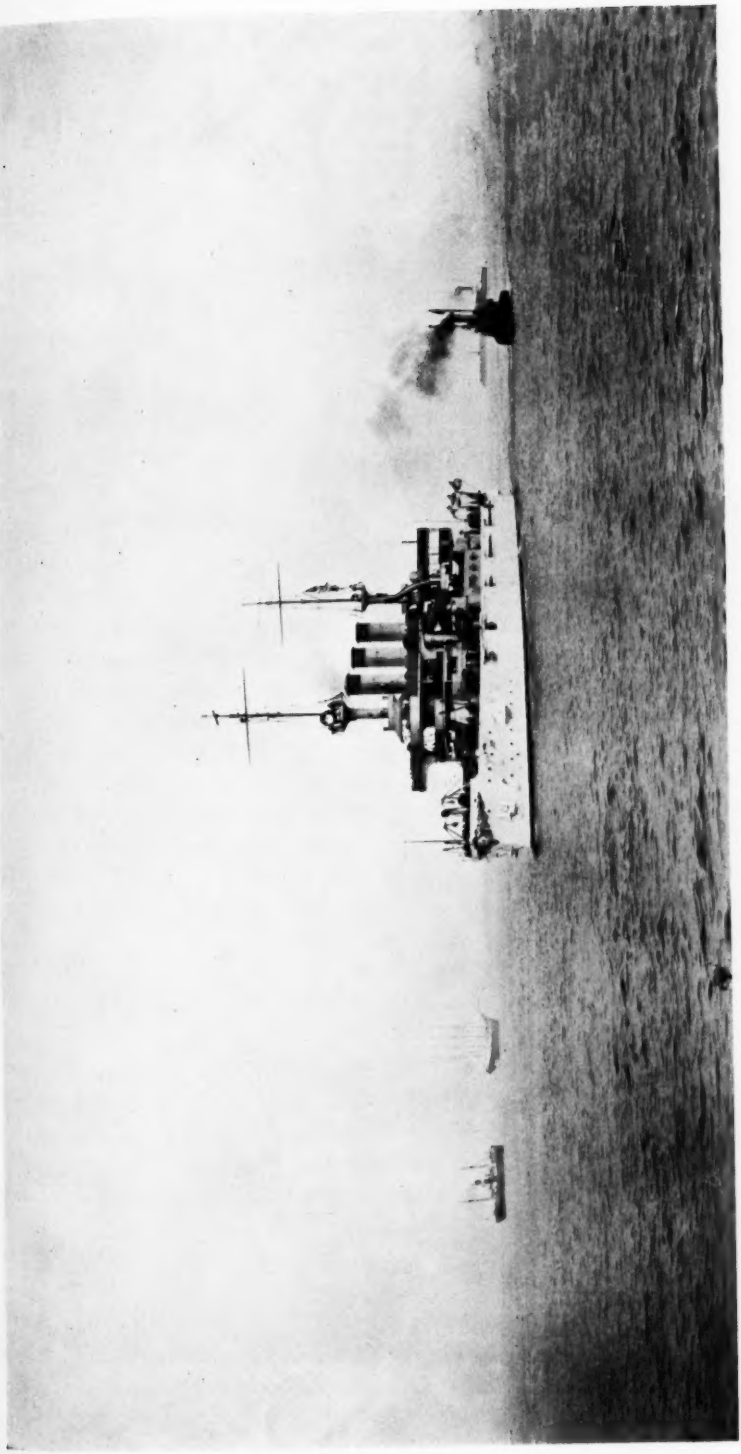
Captain Andrew W. Johnson (June 12, 1875), Captain Stephen B. Luce (January 1, 1878), Captain Ralph Chandler (February 15, 1881), Lieut. Commander George T. Davis (August 10, 1881), Commander H. L. Howison (November 17, 1881), Captain James H. Gillis (February 22, 1882), Captain A. V. Reed (November 29, 1884), Commander Theodore F. Kane (January 15, 1886), Captain Gilbert C. Wiltse (April 4, 1888), Lieut. Commander E. S. Houston (February 4, 1891), Captain E. E. Potter (April 1, 1891), Captain J. R. Bartlett (January 14, 1893), Lieut. Commander J. C. Rich (May 15, 1893), Commander E. M. Shepard (July 17, 1893), and Captain Henry F. Picking (November 21, 1894). In 1895 the *Minnesota* was transferred to the Massachusetts Naval Militia, to which she remained assigned until August, 1901, when she was sold at Boston to Thomas Butler & Co., for $25,738.38.

CONNECTICUT

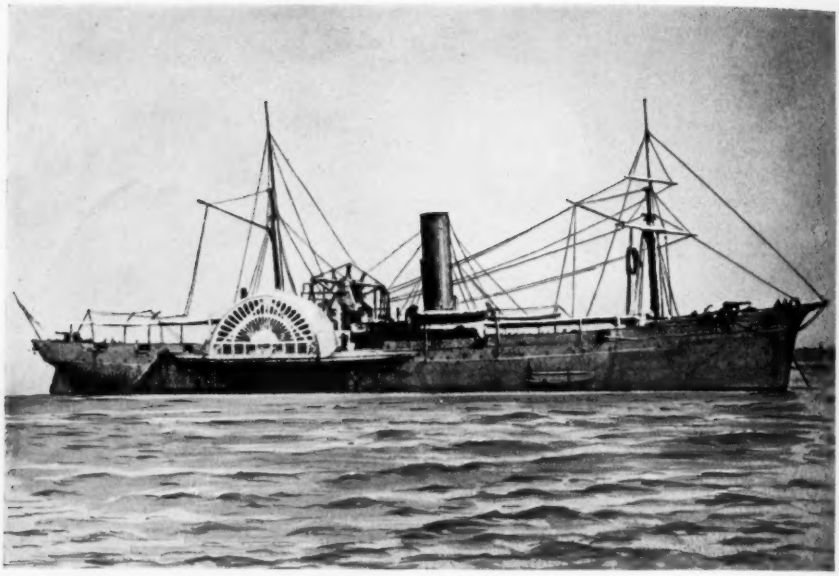
CONNECTICUT.—One of the original thirteen states of the Union. It was settled by the English in 1633-36, and received a charter from Charles II in 1662.

The battleship *Connecticut* is the sixth ship of our navy to bear the name of the Nutmeg State. She was authorized by the Act of Congress approved July 1, 1902, and was launched at the New York Navy Yard on September 29, 1904, her cost of construction being $4,212,000. Her principal dimensions are: length, 450 feet; breadth, 76 feet 10 inches; draft, 24 feet 6 inches, and displacement, 16,000 tons. Her hull is steel throughout, and is protected at the water-line by a complete belt of armor 9 feet 3 inches wide, having a maximum thickness of 11 inches for about 200 feet amidships. Forward and aft of this the thickness of the armor is gradually decreased to 4 inches at the stern and stem. The casemate armor around the 7-inch guns on the gun deck is 7 inches thick, while protection to the 3-inch battery is afforded by 2 inches of nickel steel. The 12-inch barbettes consist of 10 inches of armor in front and 7½ inches in the rear, and the turrets themselves have a front plate of 12-inch armor. The 8-inch turret guns have 6½ inches of armor. There is also a protective deck of 3-inch armor extending the entire length of the ship.

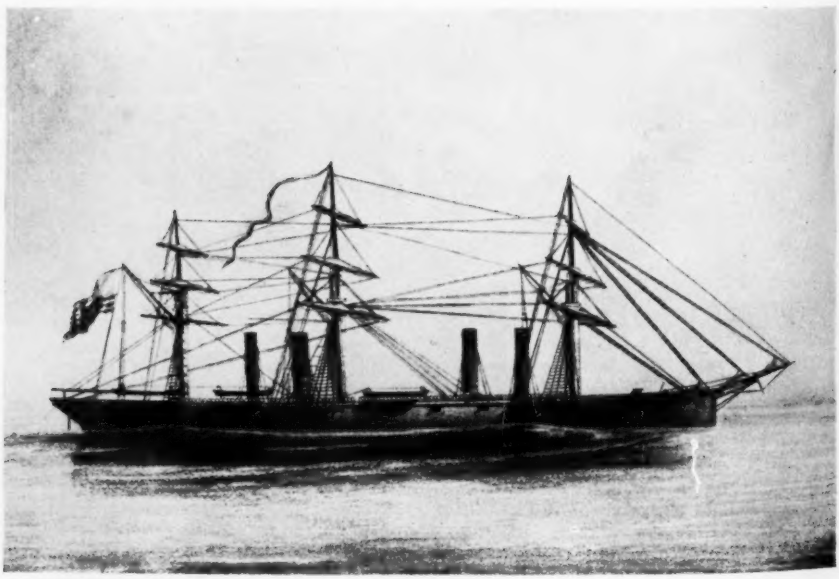
The main battery of the *Connecticut* includes four 12-inch B. L. R.'s mounted in pairs in turrets forward and aft, eight 8-inch rifles



U. S. S. "Connecticut"



U. S. Supply Ship "Connecticut"



U. S. Screw Steamer "Connecticut"

in pairs in four turrets placed at the corners of the superstructure, and twelve 7-inch B. L. R.'s in broadside. The secondary battery includes twenty 3-inch rapid fire guns, twelve semi-automatic 3-pounders, and the usual field pieces and boat guns. There are also four torpedo tubes.

The propelling machinery of the *Connecticut* consists of two sets of vertical, four-cylinder, triple-expansion engines, of a combined horse power of 20,525. There are 12 Babcock and Wilcox boilers. Her trial speed was 18.78 knots. The *Connecticut* carries a complement, as flagship, of 41 officers and 840 men.

The *Connecticut* was commissioned at New York on September 29, 1906, and made her first cruise under Captain William Swift, sailing on December 15. Under Captain Hugo Osterhaus (April 4, 1907), she became flagship of the commander-in-chief of the Atlantic fleet, and, after attending the Presidential review in June, 1907, she left Hampton Roads on December 16 for the cruise around the world, returning to home waters in February, 1909. Subsequent to this the *Connecticut* continued with the fleet, as flagship, until December, 1912, when the *Wyoming* joined the fleet and became the fleet flagship. From December, 1913, to July, 1914, the *Connecticut* was stationed off the coast of Mexico on duty in connection with the revolution in that country. The commanding officers of the ship, from 1909 to 1915, were: Lieut. Commander Louis R. de Steiguer (March 21, 1909), Captain John M. Bowyer (April 21, 1909), Captain Walter C. Cowles (June 2, 1909), Captain Albert W. Grant (November 1, 1909), Captain William R. Rush (March 15, 1910), Captain Hugh Rodman (January 3, 1912), Captain John J. Knapp (October 24, 1912), Lieut. Commander I. C. Wettengel (October 24, 1914), and Captain Edward H. Durell (December 28, 1914).

The fifth *Connecticut* was one of the single-turret, harbor-defence monitors authorized by Congress on May 4, 1898. Her principal dimensions were: length, 252 feet; breadth, 50 feet; draft, 12 feet 6 inches, and displacement, 3228 tons. She carried a battery of two 12-inch B. L. R.'s mounted in a turret forward, four 4-inch R. F.'s, and three 6-pounders. The *Connecticut* was laid down at Bath, Me., on April 17, 1899, and launched on November 24, 1900. Previous to this date, however, her name was changed to *Nevada*. The ship is still in service, but now

known as the *Tonopah,* which name was assigned to her on March 2, 1909.

The fourth *Connecticut* was one of the six high-speed cruisers designed by the Navy Department in 1863. She was a wooden vessel of 4446 tons displacement, 335 feet length, 48 feet beam, and 3713 tons (old measurement). Her machinery was built by the Corliss Steam Engine Company of Providence, R. I., and consisted of two horizontal, direct-acting engines and eight boilers. Her battery, proposed in 1864, was to include two 100-pounder rifles, two 60-pounder rifles, twelve 9-inch smoothbores, and four howitzers. Her cost of construction was $535,584.68.

The keel of the *Connecticut* was laid at the Boston Navy Yard on January 2, 1864, but she was never completed. She stood in frame on the stocks for many years, and was finally stricken from the Navy Register in 1883, and broken up in the year following.

The third *Connecticut* was a side-wheel steamer of 1725 tons, bought at New York on July 18, 1861, from S. L. Mitchell for $200,000. She was a wooden vessel of 251 feet 6 inches length, 38 feet 2 inches breadth, and 22 feet 7 inches depth of hold. She had one beam-engine and a sea speed of approximately 10 knots. Her armament on August 23, 1861, consisted of four 32-pounders and one rifled 12-pound howitzer. Later (November 2, 1861) her battery was changed to two 8-inch 55-cwt. guns, and one 30-pounder Parrott rifle. On December 27, 1862, she carried two 32-pounders, one 50-pounder Dahlgren rifle and one 30-pounder Parrott gun. This was again changed, on December 31, 1863, to one 100-pounder, two 30-pounder Parrotts, and eight 8-inch 63-cwt. guns. The total cost of repairs to the *Connecticut,* while in service, amounted to $39,836.11.

On August 23, 1861, the *Connecticut,* which before her purchase was known as the *Mississippi,* was placed in commission at New York by Commander M. Woodhull, and two days later she sailed on her first cruise. She was engaged almost entirely as supply ship for the blockading squadrons, carrying stores, mails and passengers from New York to the various stations along the Southern coast, and while engaged in this duty she captured five prizes. On June 29, 1862, Commander E. A. Barrett relieved Commander Woodhull, and he in turn was succeeded in command

of the *Connecticut* by Lieutenant M. Haxtun (August 21, 1862). On November 15, 1862, the *Connecticut* returned to the New York Navy Yard for repairs. In the middle of December she was again placed in service, under Commander G. H. Cooper (December 15, 1862), for the purpose of assisting in the convoy of the mail steamers for Aspinwall, from which cruise she returned to port on June 6, 1863.

Under Commander J. J. Almy (August 3, 1863), the *Connecticut* made a cruise off the North Carolina coast for the interception of blockade runners. She left New York on August 12, 1863, and, after a most successful cruise, in the course of which she made seven prizes, she was placed out of commission at Boston on October 7, 1864. Her last cruise before the close of the Civil War was made under Captain C. S. Boggs (February 17, 1865), and lasted from February 21 to August 3, 1865. On August 11 the *Connecticut* was placed in ordinary at Philadelphia, and, on September 21, 1865, she was sold at auction to D. B. Allen for $137,000.

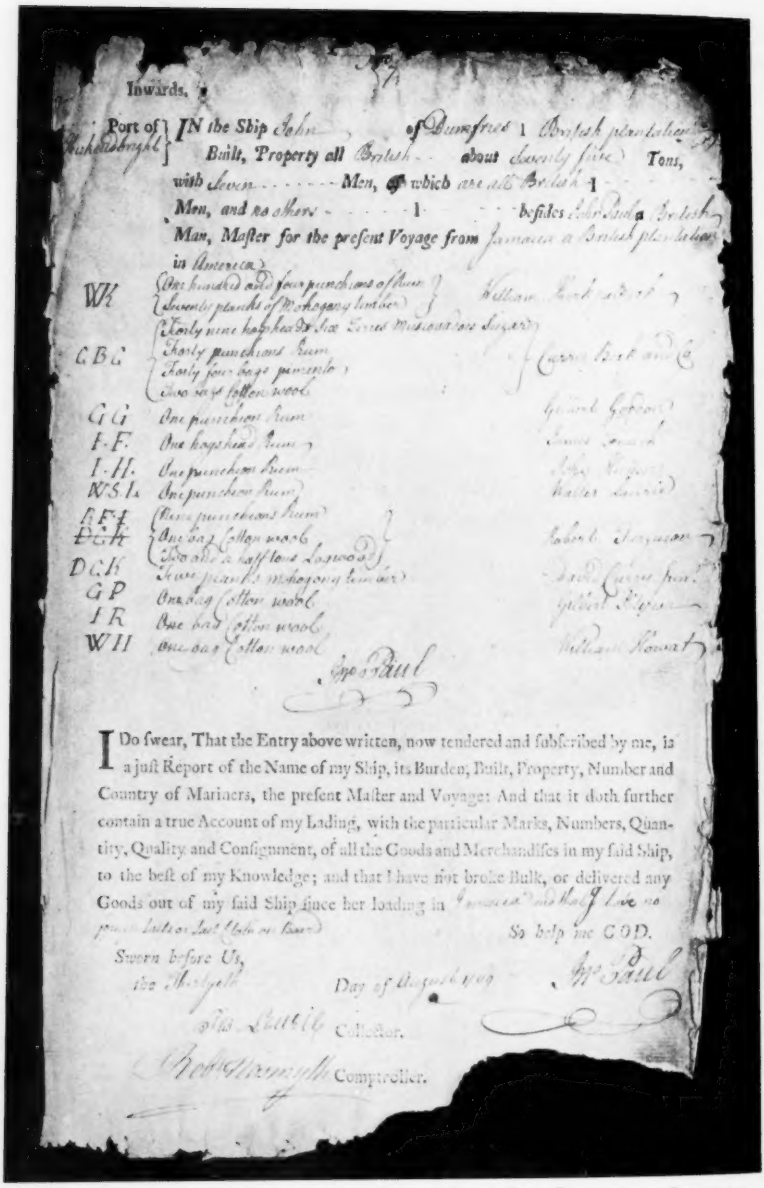
The second *Connecticut* was a 24-gun ship of 492 tons constructed under authority of the Act of Congress of June 30, 1798. She was built by contract at Middletown, Conn., by S. Overton, and was launched in May, 1799. Her cost of construction was $57,260. She carried a battery of 24 guns, of which the 12-pounders were mounted on her gun deck, and the 6-pounders on the quarter deck. Her crew consisted of 220 men.

In 1799 the *Connecticut* was commanded by Captain Moses Tryon. She was ordered to Porto Rico in September, after which she proceeded to St. Christopher, where she joined Captain Morris' squadron in the middle of December. "We left there immediately for the island of Guadeloupe," wrote an officer of the *Connecticut,* "and on the 29th of the same month, off that island, captured the copper-bottomed French privateer *L'Italie Conqueste* of 12 guns and pierced for 18." And in addition to this valuable prize, the *Connecticut* also recaptured two American vessels and chased a French ship ashore. Later in the year the *Connecticut* was assigned to Commodore Truxton's St. Kitts squadron. The *Connecticut* also made a cruise in command of Captain R. Derby.

During the last year of the war with France, it was the intention of the Navy Department to send the *Connecticut* on a cruise to

the East Indies, in company with the *Ganges,* but, with peace in prospect, the vessels did not sail. Instead, the entire naval establishment was placed upon a peace footing and the majority of the vessels sold. The *Connecticut* was not among the ships retained in the navy, and she was in consequence sold at New York in 1801, for $19,300.

The first *Connecticut* was a wooden gondola built at Skenesborough, N. Y., in 1776, for service on Lake Champlain. She carried three long guns and eight swivels. Her crew included 45 men. Under Captain Grant the *Connecticut* formed part of the flotilla which, under General Benedict Arnold, disputed the advance of the British army of invasion in the fall of 1776. Americans lost all their vessels, but "never," to quote from Clowes' great history of the Royal Navy, "had any force, big or small, lived to better purpose or died more gloriously." The southward march of Burgoyne's army was delayed another year, and the colonists were allowed twelve months more in which to complete their preparations and make possible their victory at Saratoga.



Inwards.

Port of Kirkcudbright } IN the Ship John of Dumfries 1 British plantation
Built, Property all British about twenty five Tons,
with seven Men, of which are all British 1
Men, and no more 1 besides John Paul a British
Man, Master for the present Voyage from Jamaica a British plantation
in America

WK (One hundred and four puncheons of Rum
Seventy planks of Mahogany timber
Forty nine hogsheads & five Barrels Muscovado Sugar)
CBC (Forty puncheons Rum
Forty four bags pimento
Two sacks cotton wool)
GG One puncheon Rum
FF One hogshead Rum
IH One puncheon Rum
WSL One puncheon Rum
EFL One puncheon Rum
DCH (One bag Cotton wool
Two adze & half feet Logwood)
DCH Seven planks Mahogany timber
GP One bag Cotton wool
JR One bag Cotton wool
WH One bag Cotton wool

John Paul

I Do swear, That the Entry above written, now tendered and subscribed by me, is a just Report of the Name of my Ship, its Burden, Built, Property, Number and Country of Mariners, the present Master and Voyage: And that it doth further contain a true Account of my Lading, with the particular Marks, Numbers, Quantity, Quality and Consignment, of all the Goods and Merchandises in my said Ship, to the best of my Knowledge; and that I have not broke Bulk, or delivered any Goods out of my said Ship since her loading in Jamaica and that I have no
[illegible] Letter or Last Clearance on Board.

So help me GOD.

John Paul

Sworn before Us,
the Marks of
Day of August 1769

Collector.

Comptroller.

FACSIMILE OF THE MANIFEST OF THE SHIP "JOHN" OF DUMFRIES, SCOTLAND, JOHN PAUL, MASTER, AUGUST 30, 1769
From the Original in the London Custom House

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

A REPORT OF JOHN PAUL, MASTER OF THE SHIP *JOHN*

By CHARLES O. PAULLIN

In the London Custom House there are two manifests or reports made by John Paul Jones to local customs officials when he was master of the ship *John*. These bear the signature "John Paul," which is exceedingly rare, as nearly all the Jones papers in existence were written subsequent to the time when he changed his name. One of these manifests is dated August 30, 1769, and is the earlier of the two, if my memory serves me right. Through the kindness of Mr. Henry Atton, librarian of the customs library in London, who used this manifest in his book, "The King's Customs," it is here reproduced in facsimile.

From the manifest we learn that the *John* was a Dumfries ship (not a Kirkcudbright ship as given by most authors), of about 75 tons burden, British plantation-built and British owned, and carried a crew of seven men—on this voyage all British. She had recently arrived from Jamaica at Kirkcudbright, in southwest Scotland, with a cargo of rum, sugar, mahogany, logwood, pimento and cotton. Part of the cargo was consigned to Currie, Beck & Co., owners of the *John*. An endorsement on the manifest shows that she sailed from Kirkcudbright to Whitehaven, England, to complete the discharge of her cargo.

The *John*, a brigantine, was the first ship commanded by Jones, and in 1769-1770 he made two voyages to the West Indies as her master. It is said that he obtained his command in this way: He was returning home from a slaving adventure, and sailed on the *John* as a passenger. During the voyage both the captain and the mate died of fever, and he took charge of the ship and brought her into port, being the only one left on board capable of navigating and commanding her. For this service he was appointed

master of the *John* by her owners, Currie, Beck & Co., a Scottish firm, of Whitehaven, Cumberland, England (according to Mr. Atton), or of Kirkcudbright, Scotland (as usually stated).

Jones's second voyage was made in 1770, in the course of which he became involved in a difficulty with Mungo Maxwell, the carpenter of the vessel, whom he flogged for neglect of duty. In May of that year the *John* was at Tobago; in August, at Grenada; and by November, in Scotland. Shortly after the end of this voyage Jones gave up his command, the vessel was sold, and the firm of Currie, Beck & Co. was dissolved (Robert C. Sands, Life and Correspondence of John Paul Jones, pp. 17-22; Atton and Holland, The King's Customs, II., 439; Charles W. Stewart, John Paul Jones Commemoration, p. 115).

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

INDUSTRIAL MANAGEMENT IN NAVY YARDS

By NAVAL CONSTRUCTOR I. I. YATES, U. S. Navy

Although the subject of industrial management in navy yards has been talked to death since the first departure from the bureau system was made in 1909, no solution of the problem has been accepted by the department as to the best type of management to put in force in all the yards. There are no two yards organized alike, and even where the manufacturing divisions have been consolidated into one industrial department, no common type of management is found. It is considered possible, however, despite the differences in organization, to approach ideal methods of accomplishing work in the yards that will be the same for all and it is proposed to discuss certain of these methods.

I. THE ENDS IN VIEW

There should first be defined the ends in view of the ideal system of management and it is considered that these should be,

(a) To secure the completion of work in the order of its importance, including the earliest possible completion of urgent work.

(b) To avoid starting work until it can be carried through continuously and without delays, due to lack of material or other causes.

(c) To lay out work ahead so as to keep the working force constantly busy, avoiding the necessity of fluctuations in the force as far as practicable.

(d) To perform work in an economical and satisfactory manner.

(e) To provide a method for the management to ascertain with the least delay the exact status of all work in hand and the best way to re-schedule it, necessitated by taking up more urgent work.

The above purposes to be accomplished are mutually dependent, and the first and last named are especially important for work on ship repairs. It is most necessary not only to complete repairs to vessels of the fleet as soon as possible, but it may be vital to ascertain in advance the date on which they will be completed. The cost of ship work has often to be subordinated to the time in which it has to be done, but good management does not postulate extravagance. Navy yards are primarily for the maintenance of the fleet and it is a military, even if not industrial, necessity to know exactly how all fleet work stands, what new work may be undertaken, and its time of completion.

II. MEANS OF SECURING THE ENDS

To secure the above stated ends the following means should be used:

(a) Plan all authorized work in detail by technical experts in a central office down to the point where the separate shop-planning offices can further plan for inside work, and to the point where the leading man thoroughly understands what is to be done on outside work.

(b) Analyze each job into the operations necessary for its performance, estimating the number of men and days required for each operation, and preparing a chronological schedule of the operations, showing the number of days after the job is started when each operation should be commenced and completed.

(c) Prepare drawings to accompany specifications of jobs when necessary.

(d) Obtain the material necessary for the job by the time it is needed.

(e) Set dates in advance for the starting and completion of each operation of a job, the dates being set according to the date of completion desired for the entire job and as the working force permits.

(f) Provide for constant supervision of work and men.

(g) Maintain a continuous record of the status of all work and the distribution and work ahead for the force.

III. DISCUSSION OF THE MEANS

Centralized planning of work is necessary to coordinate the operations of a job involving work by more than one shop force.

But it is not necessary nor desirable to plan in the central office the parts of an operation performed in but one shop; each shop should have a local planning office of its own for that purpose and for the purpose of shop routing.

Centralized dispatching of both work and men is vital, for in no other way can the first three mentioned "Ends in View" be met. The work must be scheduled and the force distributed simultaneously. It is not possible to divide the function of dispatching among the shops for the dates set, for the various operations of a job must fit into each other, necessitating a coordinating central office.

No workman should be detailed to a job until it has been ascertained that he can proceed with that work, *i. e.*, that the necessary preliminary operations have been completed; that accessibility to the work has been provided, including staging, if necessary; that pneumatic power, lights, etc., are at hand, if necessary, and that he is provided with the proper tools and detailed specifications for proceeding with the work. To accomplish this, the work must be planned out in advance and dates so set that the workman may begin when ordered.

The means provided may be grouped into the three functions of planning, dispatching, and execution.

IV. PLANNING

The function of planning includes preparations of the specifications, drawings, analysis of the work into the chronological operations necessary for its performance, estimate of men-days to perform each operation, schedule of number of days after the job is started that each operation should be started and completed, and ordering the material. The entire function should be placed under one head, but the duties should be carried out in three sections—planning, drafting, and material.

The planner examines the item of work to be undertaken, specifies exactly what is to be done, orders drawings, if necessary, lists the material needed, words the job order, analyzes it into operations, and schedules the operations.

The draftsman examines the work, in company with the planner, and should consult the latter freely. The planner should list the material called for by the drawing, in addition to all other ma-

terial necessary for the job. Careful lined drawings should not be prepared unless necessary or for "repeat" work; dimensioned sketches should be used whenever possible.

The material clerk has the material listed by the planner checked to see if it is in store, and, if so, reserves it for the job. If not in store, he orders it to be delivered by dates set by the planner, who is guided by the completion date of the vessel, or instructions of the head of the planning department.

The job order to perform the work issued by the planning department should include the account number to which to charge the cost, the specifications of the job, the analysis by operations into separate shop orders, and the time schedule. It should be accompanied by the material list checked to show items reserved in store, and due dates for those not in store; and by the drawings.

No further planning should be necessary for outside work, but for work inside a shop, the shop order should be further planned out and material routed by the shop planning office.

V. DISPATCHING

The dispatching office should issue the shop orders with dates so set that

(a) The total outside force in any trade need not be increased.

(b) The total outside force in each trade is kept busy without necessity for discharges.

(c) The dates set for shop work may be met.

(d) The shop force need not be decreased or increased.

(e) The work in a given compartment is laid out logically, *i. e.*, first work on decks or bulkheads, then piping, conduit, fittings, etc., and lastly painting.

(f) No interference occurs due to crowding in a compartment, working two gangs on one object simultaneously, etc.

The dispatching office coordinates the work of the various trades on the different ships—this coordination could not be accomplished if left to the shop-planning offices.

The dispatching office should contain the following mechanical aids to accomplish its work:

(a) *Trade Board.*—Shows the number of mechanics of each trade available to-day, and the number scheduled for to-day and each succeeding day.

(b) *Progress Board.*—Shows the number of men of each trade working on given operations each day.

(c) *Tickler Rack.*—Consists of a number of dated pockets, into which is placed one copy of each shop order when issued, according to date of completion.

(d) *Job Order Rack.*—A file of outstanding job orders arranged according to ship and job number.

Upon receipt of a job order the locality should be examined by the dispatching office to see that the job may be started and that it does not conflict with other authorized work. The trade board should be examined to see when the men-days required by the schedule will become available. If the item is urgent the date to start should at once be entered and existing work re-scheduled to allow the new work to be done at once. Setting the starting date automatically sets the completion date and the date to start and complete each operation—all the men-days required for the job are then entered on the trade board.

The shop orders scheduled should be issued five days, where possible, ahead of their starting dates, and when issued the men-days required should be entered on the progress board and a copy of the order placed in the tickler rack.

VI. EXECUTION

The actual execution of all outside work should be under the supervision of but one official—the outside superintendent, and he should also have control of the dispatching office. He should be assisted by a dispatching superintendent in charge of the dispatching office, and by ship superintendents, in charge of the work on the various ships—no two superintendents being assigned to work on the same ship.

The work is followed up on the ship by the ship superintendent to see that it is done properly and economically.

The work is followed up on the schedules by the dispatching superintendent, to see that it is done without delay and is completed by the date desired.

The workmen are directly supervised by the leading men, quartermen, foremen, and ship superintendent.

Upon receiving a shop order for work the leading man should fulfill the following requirements before assigning it to his work-

men, unless the directions on the face of the order are sufficiently clear to show none of them necessary:

(a) He should personally investigate the work to be done and ask for further instructions at the dispatching office, if details are not clear or complete, and upon assigning a workman to the job, he should thoroughly instruct the man as to what is to be done; should inform him as to what tools are necessary, and should see that the necessary material has been delivered. Sufficient tools and material for at least half a day's work should be taken to the job when work is begun.

(b) He should ascertain whether the work can be proceeded with before sending a workman to the job; in particular whether free access be provided; necessary material on hand; dependent operations completed; and compressed air, light, staging, etc., provided if necessary. The dispatching officer will have provided the foregoing as far as can have been foreseen when issuing the shop order, but the leading man should make sure all have been provided, before sending the man to work.

The execution of work inside the shops should be supervised by the shop superintendent and the foremen, assisted by the shop planning offices, which should be organized to plan out all shop details; including providing material, tools, templates; laying out work, moving from machine to machine; and providing a work card ahead for every workman. Shop leading men should oversee the performance.

VII. PRACTICABILITY

The practicability of the foregoing methods have been demonstrated at the navy yard, Puget Sound, where they have been in more or less complete operation since July, 1911. Exhibits of the schedule, trade board, and progress board as used at that yard are here shown.

SHOP M.O.

TRADE Machinist

J.O.Nº OR BRIEF

TRADE PROGRESS SHEET.

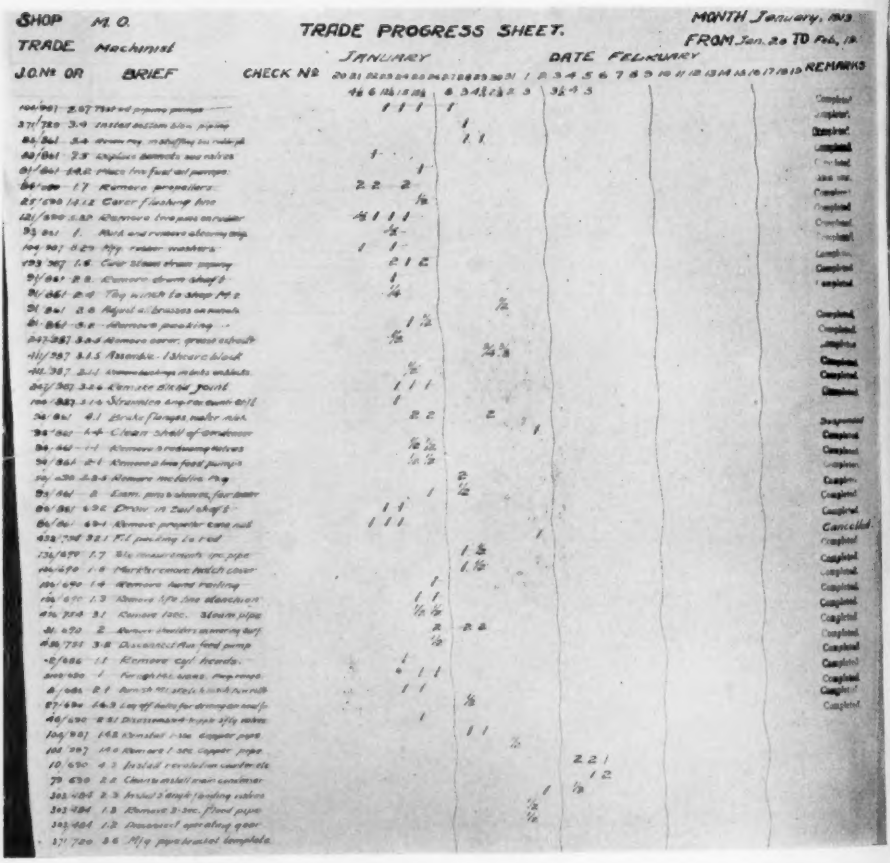
MONTH January, 1913

FROM Jan. 20 TO Feb. 19

JANUARY — DATE FEBRUARY

CHECK Nº 20 21 22 23 24 25 26 27 28 29 30 31 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

REMARKS



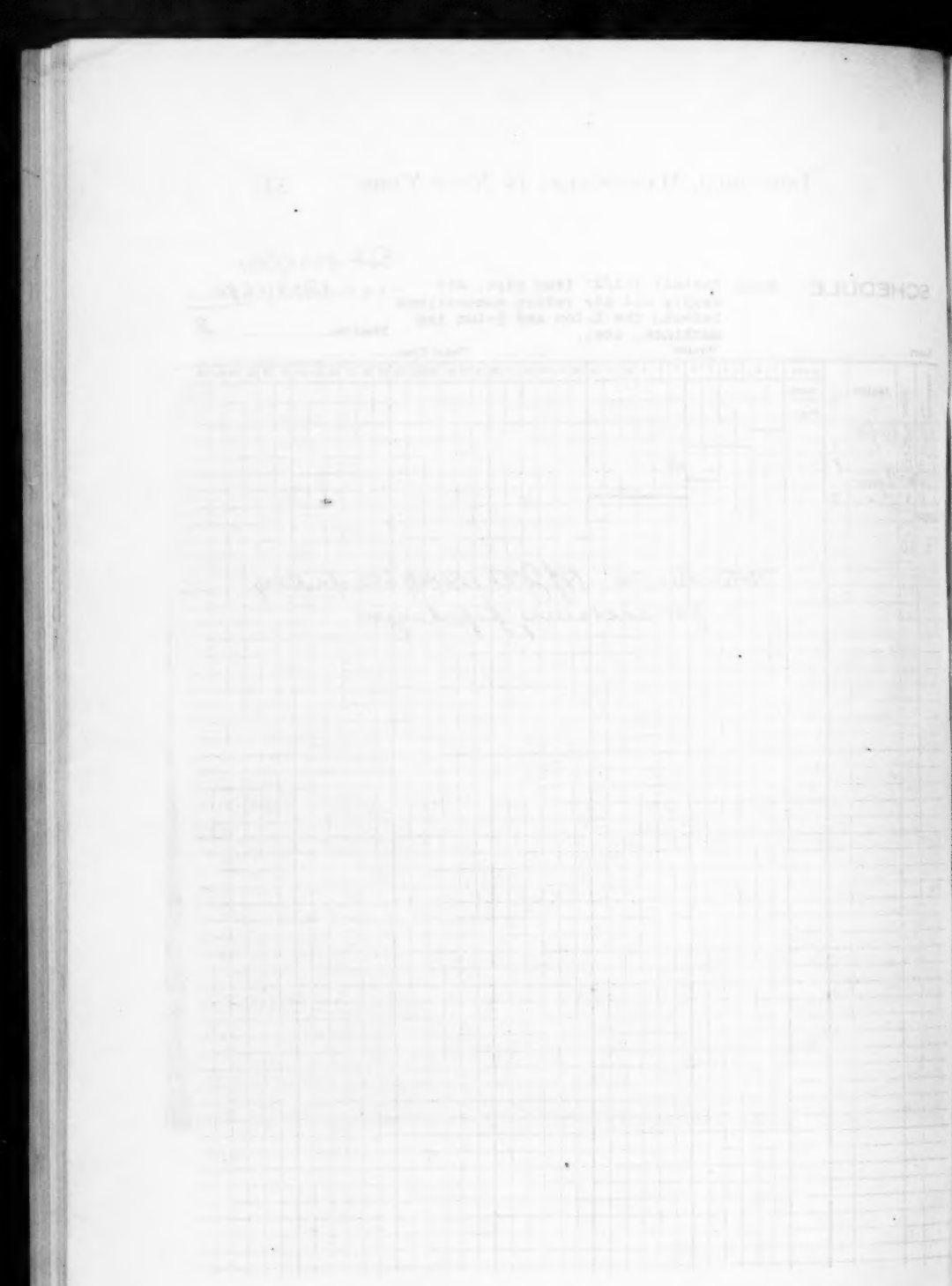
Est 5235/901

SCHEDULE Brief: Install 1-1/2" iron pipe, air supply and air return connections between the 1-ton and ½-ton ice machines, etc., J. O. No. 3D231/690 Sheet No. 5

Start ..... Finish ..... Total Time .....

Number	Grade	TRADES	MEN	DAYS 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36
				Month
				Day
1.1	C	Pipefit		
1.2	C	"	1	
1.3	C	"	1	
1.4	AO	Pipecov		
1.5	"	"	2	
2	10			

Note = See Op. 10 of J.O. 1D148/690, drilling for installing pipehangers



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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

TETRA-NITRO-ANILINE[1]

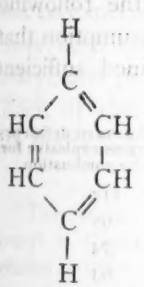
(T. N. A.)

By LIEUTENANT W. W. BRADLEY, U. S. Navy

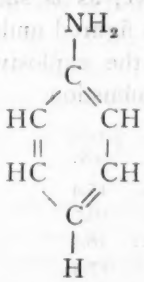
Tetra-nitro-aniline (briefly designated as T. N. A.) is the latest explosive to claim marked attention in the field of military explosives. The term T. N. A. is probably familiar to nearly all of the officers of the naval service, yet the scarcity of literature regarding this substance, the difficulty of finding what little there is, and the technical form in which it is written, all lead the writer to attempt to present clearly some of the more important properties and probable uses of this promising explosive.

Tetra-nitro-aniline is the strongest solid explosive compound known and, as such, must claim the greatest attention and most careful consideration from a service which has so much at stake on the quality and strength of its explosives.

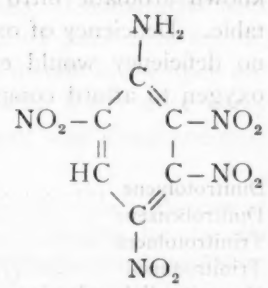
It is a tetra-nitro derivative of aniline, which in turn is a simple derivative of benzene, as shown by the graphic formulas below.



Benzene (C_6H_6).

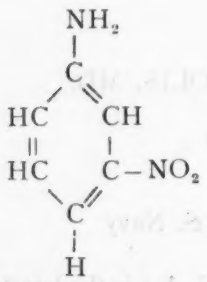


Aniline ($C_6H_5NH_2$).



Tetra-nitro-aniline ($C_6H\,NH_2\,(NO_2)_4$).

[1] Since this article was written, the Bureau of Ordnance has concluded a series of experiments with tetra-nitro-aniline to determine its suitability for adoption as a service explosive. T. N. A. in the unmodified state has been found to have a serious tendency to decompose when in contact with moisture, even at ordinary temperatures. Although this disadvantage may be overcome to some extent by water-proofing, the explosive force of the material has not been found superior to T. N. T., the suitability of which as a military explosive is well known.



Meta-nitro-aniline ($C_6H_4NH_2NO_2$).

Tetra-nitro-aniline is prepared by the action of a mixture of nitric and sulphuric acids upon meta-nitro-aniline,[2] the graphical formula of which is here illustrated. Ortho-nitro-aniline and para-nitro-aniline, although having the same empirical formula as meta-nitro-aniline ($C_6H_4NH_2NO_2$), do not yield tetra-nitro-aniline when subjected to this same treatment.

Tetra-nitro-aniline is formed in yellow crystals, the exact size and hue of which varies with the method used in the preparation. Its melting point is 216-217° C., at which temperature it melts with decomposition.[3] If heated quickly, it will decompose at a lower temperature than that given above, but its decomposition due to heat alone is never explosive. Its ignition point is 220° C., which compares very favorably with that of tetryl, which is 186° C. under similar conditions. Its specific gravity is 1.867.

It is practically insoluble in water at ordinary temperatures; is slightly soluble in benzene, chloroform, or ligroin; is more soluble in acetic acid, nitrobenzene, acetone, etc.

Its deficiency in oxygen is less than that of any previously known aromatic nitro explosive, as is shown by the following table. Deficiency of oxygen is figured under the assumption that no deficiency would exist if the explosive contained sufficient oxygen to afford complete combustion.

	%N.	Grams of oxygen deficiency per 100 grams explosive for complete combustion.
Dinitrotoluene	15.4	114
Dinitrobenzene	16.7	95
Trinitrotoluene	18.5	74
Trinitroanisol	17.3	63
Hexanitrodiphenylamine	22.3	53
Tetryl	24.4	47
Picric acid	18.3	45
Tetranitroaniline	25.6	32

[2] U. S. Patent No. 1045011, dated Nov. 19, 1912. Bernhard Jacques Flurscheim, Ph. D., inventor.

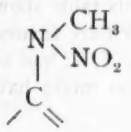
[3] This melting point is for an elevation of temperature of 5°C. per minute, for the pure product. The melting point as given in Dr. Flurscheim's patents is 210-212°C.

This table also shows that the percentage of nitrogen in tetra-nitro-aniline is greater than in any other of the explosives enumerated. Since oxygen, in pure nitro explosives, is present almost entirely in the nitro groups, a high nitrogen content will necessarily indicate a high oxygen content. For obvious reasons, a high oxygen content will indicate a low oxygen deficiency. The reverse of this reasoning does not always hold true, since there are cases (picric acid being a notable one) in which the oxygen deficiency is small while the nitrogen content is not large. In the case of picric acid, this is due to the fact that it has a molecule of oxygen in the OH group, thus increasing its oxygen content without correspondingly increasing its nitrogen content.

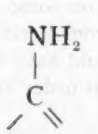
Tetra-nitro-aniline is the first nitro explosive in which four nitro groups have been attached directly to the carbon ring (as shown in the graphical formula), all efforts having failed heretofore to accomplish this result. In tetryl (tetra-nitro-methyl-aniline) there are four nitro groups, but one of them is in the side chain,[4] leaving only three directly attached to the ring. Due to this construction, tetryl has a smaller percentage of nitrogen than tetra-nitro-aniline.

Tetra-nitro-aniline is a neutral compound,[5] and would therefore not be expected to show any action on metals. Comparative tests have been carried out by placing 0.2 gm. of tetra-nitro-aniline, tetryl, and picric acid on sheets of various metals in the open air. Each of the compounds was moistened with water once every 24 hours for 14 days. A blank experiment was simultaneously

[4] The placing of one of the nitro groups in the side chain in the case of tetryl is illustrated by the use of the graphical formulas for the side chains in the 1 position of tetryl and of tetra-nitro-aniline as shown below.



Tetryl.



Tetra-nitro-aniline.

[5] Z. ges. Schiess-Sprengstoffw 8, 185-8. Chemical Abstracts 7 (1913), 2685.

carried out in which the metal alone was moistened with water. The results are given in the following table:[6]

	Steel	Iron	Tin	Copper	Brass	Lead	Aluminum	Zinc
Water alone	Dark brown	Brown	Unchanged	Less than Tetryl	Unchanged	White stain	Unchanged	Very light brown
Tetryl	Brown	Brown	Unchanged	Slight darkening	Unchanged	Unchanged	Unchanged	Unchanged
T.N.A.	Dark brown	Dark brown	Slight grey color	Slight darkening	Unchanged	Unchanged	Unchanged	Very light brown
Picric acid	Dark brown	Black	Metal attacked	Yellowish brown	Yellowish brown	Dark brown	Brown ring	Dark brown

The hygroscopicity of tetra-nitro-aniline is very small, so small that it may be considered as practically non-hygroscopic. The manufacturers state that when exposed to an atmosphere of 85 per cent saturation, at ordinary temperature, for one week, the material showed an increase in weight of only 0.12 per cent. Recrystallized tetra-nitro-aniline, under the same conditions, showed an increase of only 0.023 per cent in weight.

The stability of the pure compound is excellent.[7] Heat tests have given the following results. After being stored for three months at atmospheric temperature, a heat test of 50 minutes at 65.5° C. was obtained. A small sample which had been stored for three months at atmospheric temperature was heated to 100°

[6] From literature of the Verona Chemical Company. The chemical action of picric acid on some metals is well known. This table shows what may be expected from picric acid under conditions which are favorable for such action. It would have been most interesting if T. N. T. had been included in this table in order that its well-known inertness might have been used as a criterion.

[7] Les Poudres et Explosives (L. Vennuir et G. Chesneau, 1914), says of this explosive: "C'est un explosif trés stable qui parait trés intéressant."

The first lots of this material tested in this country (by recognized government authorities) gave very unsatisfactory results in the stability tests. T. N. A. received at a later date has given results fully confirming the statement made here.

C., held there for 15 minutes, and then given the regular KI test. This sample still gave a test of 50 minutes at 65.5° C.[8]

Dr. Flurscheim states in his patent[9] that tetra-nitro-aniline "is characterized by the remarkable facility with which its nitro group in the 3 position may be replaced by other groups." Up to the present time investigations of this particular feature have not progressed sufficiently far so that a definite opinion may be expressed as to whether or not this remarkable facility of replacement will prove a deterrent to the use of this explosive for military purposes.

As previously stated, tetra-nitro-aniline is the strongest known solid explosive compound. The following comparative brisance[10] or force tests were obtained by using 10 gm. of the explosive designated. A No. 8 fulminate detonator was used.[11]

Lead Block (International Standard)	Trinitro-toluene	Picric acid	Tetryl	Gun-cotton	Tetra-nitro-aniline	Standard dynamite (75% N. G. 25% Guhr)
Cc net expansion per 10 gm.....	254	297	375	290	430	300
Ballistic pendulum ft. lbs. per 10 gm.....	719	808	951	923	1056	900

These tests may be supplemented by the comparative brisance tests of tetra-nitro-aniline and trinitrotoluene given below.[12]

Lead Block (International Standard)	Trinitrotoluene (average)	Tetra-nitro-aniline (average)
Cc net expansion per 10 gms.....	216	315

[8] From tests made at Picatinny Arsenal. Published by permission.

[9] U. S. Patent No. 1045011, page 2, lines 83-85.

[10] "We speak of the brisance of an explosive reaction when the surrounding inert substances, which a relatively slowly increasing pressure (of explosion) would have moved forward as a whole, or in large pieces, and in the prescribed direction, lose their form entirely and are blown to fragments. . . . . The range of the effects of brisance is supposed to be largely confined to the immediate neighborhood of the explosion and it therefore exerts its greatest influence upon the medium with which it is in direct contact." Explosives, Brunswig (Monroe and Kibler), page 111.

[11] Z. ges. Schiess-Sprengstoffw 8, 185-8.

[12] From tests made at Picatinny Arsenal.

Although, at first glance, it would seem that there is a very great difference between the values of the brisance of tetra-nitro-aniline as given in these two tables, this difference is very much diminished by comparing the figures for tetra-nitro-aniline and trinitrotoluene in each case. In the first case that we have the brisance of tetra-nitro-aniline is 1.693 times as great as that of trinitrotoluene, while in the second case it is 1.458 times as great. It is noted that this discrepancy is not such that it should be classed as unreasonable.

It should be remembered that the lead block test is a comparative test only, and that the actual enlargement of cavity obtained in one series of tests, for any given explosive, can hardly be expected to agree with the results for the same explosive obtained in another series of tests. The ratio existing between the brisance of two explosives in one test is, however, comparable to the ratio existing between the brisance of the same two explosives in another test.

From a consideration of the above, it seems safe to assume that the brisance of tetra-nitro-aniline is about 1.5 times that of trinitrotoluene.

In order that the reader may not get a false impression of the value of such data as that given above, the following quotations from eminent authorities are given: Brunswig [13] says: "It is yet an open question how far these and other similar empirical methods for measuring the relative brisance of various explosives are to be relied upon." Gutmann [14] says: "Although this apparatus [15] and Guttmann's give very valuable assistance in judging explosives, the reader is warned against relying upon them entirely for drawing absolute conclusions as to the suitability of various explosives for any specific purpose."

The sensitiveness of tetra-nitro-aniline to shock has been established by comparative drop tests. The results obtained in some of these tests are given below. The fall in each case is for a two kilogram hammer.

[13] Explosives, Brunswig (Monroe and Kibler), page 116.
[14] The Manufacture of Explosives, Guttmann, Vol. II, page 368.
[15] Referring to the Trauzl Lead Block Test.

Table I [16]

	1st Series	2nd Series	3rd Series	Average
Tetryl	25 cm.	50 cm.	35 cm.	36.66
Tetra-nitro-aniline	45 cm.	60 cm.	50 cm.	51.66
Picric acid	.....	35 cm.	.....	35

Table II [17]

Tetra-nitro-aniline	7 inches (17.78 cm.)
Trinitrotoluene	11 inches (27.94 cm.)

Table III [18]

Picric acid	35—95 cm.
Tetryl	40—65 cm.
Trinitrotoluene	57—90 cm.

These three tables were, of course, obtained under different conditions and could not be expected to agree in detail. They furnish a means of obtaining a fair comparison of the sensitiveness of tetra-nitro-aniline with that of other explosives which are now in common use. From a study of them, the writer draws the conclusion that the sensitiveness of tetra-nitro-aniline toward shock is of a degree about similar to that of tetryl; that it is somewhat greater than that of trinitrotoluene; and that is somewhat less than that of picric acid.

Since tetryl, picric acid and trinitrotoluene have all been accepted as military explosives for some time, it would seem that tetra-nitro-aniline is sufficiently insensitive to shock to meet the ordinary military requirements. Its sensitiveness may be greatly reduced by using it in combination with paraffin, as will be noted later.

Up to this time it has not been possible to detonate tetra-nitro-aniline by friction.

Careful tests (made for the purpose of establishing the suitability of tetra-nitro-aniline for a booster for military purposes) have shown that it is very sensitive toward fulminate detonators.

[16] From the Verona Chemical Co., North Newark, N. J.

[17] From tests made at Picatinny Arsenal.

[18] Explosives, Brunswig (Monroe and Kibler), page 27. Results obtained under different experimental conditions, such as moist or dry, in powdered form or pressed, etc.

Its degree of sensitiveness toward such detonators is about the same as that of tetryl, which is known to make a very good booster.

The brisance and the sensitiveness to shock of certain mixtures of tetra-nitro-aniline with other substances are given below.[19]

Composition	Lead block (International Standard) Cc. net expansion per 10 gm.	Drop test, inches 2 kilogram hammer
25% T. N. A. 75% D. N. B.	221	
33% T. N. A. 67% D. N. B.	240	
40% T. N. A. 60% D. N. B.	255	
50% T. N. A. 50% D. N. B.	277	
95% T. N. A. 5% Paraffin	290	No detonation in 5 drops. Limit 28 inches.
90% T. N. A. 10% Paraffin	215	
T. N. A. (pure)	315	7
T. N. T. (pure)	216	11

T. N. A., tetra-nitro-aniline; T. N. T., trinitrotoluene; D. N. B., dinitrobenzene. The mixtures of tetra-nitro-aniline and dinitrobenzene were prepared by stirring the T. N. A. into the molten D. N. B. The paraffin compositions were obtained by coating T. N. A. with paraffin dissolved in varnolene, with the subsequent evaporation of the solvent.

MILITARY APPLICATIONS[20]

It is the purpose of the writer to merely mention some of the various military uses for which this explosive may prove useful. Only by experiments, carried out with the material itself and under as nearly service conditions as possible, can it be definitely determined whether or not anything could be gained by substituting tetra-nitro-aniline for the explosives now in use.

Bursting Charge for Projectiles.—The writer considers that pure tetra-nitro-aniline is too sensitive to shock to warrant it being used as a shell filler. By using a coating of paraffin (95 per cent T. N. A., 5 per cent paraffin) its sensitiveness to shock is much reduced and it still retains a brisance considerably greater than

[19] From tests made at Picatinny Arsenal.

[20] For inventor's claims and formulas, see U. S. Patent No. 1045012, dated Nov. 19, 1912.

that of trinitrotoluene, picric acid, or ammonium picrate. It is true that it cannot be fused and then poured into the cavity of the projectile (there to be allowed to cool and solidify), but trinitrotoluene is about the only high explosive, suitable for military purposes, with which this can be safely done. It may also be stated that fused trinitrotoluene is very nearly as sensitive to shock as is pure tetra-nitro-aniline.

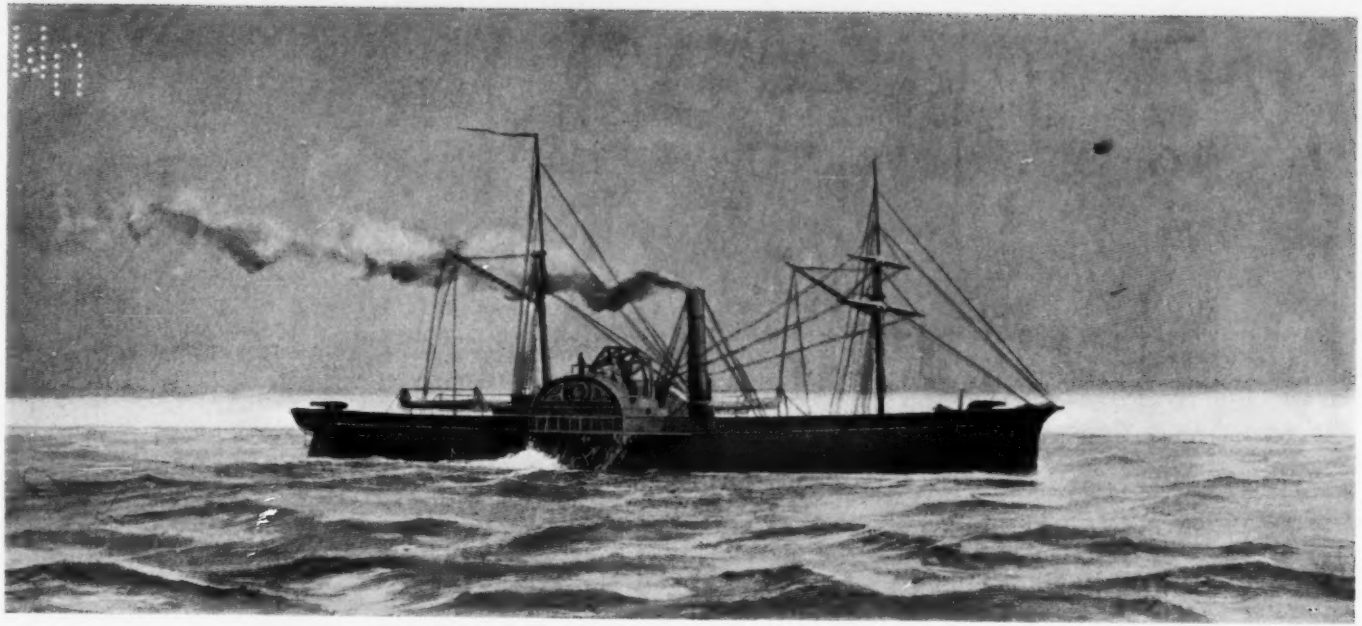
Mine and Torpedo Charges.—Tetra-nitro-aniline should be particularly suited for use as the bursting charge in a mine or a torpedo. In this class of military work the explosive is not subjected to the great shocks received by the bursting charge of a projectile. It would seem that its great brisance, coupled with its inertness toward metals, reasonable insensitiveness toward shock, and ease of detonation, would all be favorable for this class of work.

Aeroplane Bombs.—The properties of tetra-nitro-aniline would seem to indicate that it would be very suitable for aeroplane bombs. The use of such bombs, having a total weight of 22 pounds each and carrying 12 pounds of tetra-nitro-aniline per bomb, has recently been mentioned in the European press.[21]

Fuses and Detonators.—The use of tetra-nitro-aniline for the charges of fuses and detonators would do away with the necessity of using a priming charge, of either tetryl or picric acid, to inaugurate the detonation of main charge of the fuse or detonator, as it is necessary to do in many fuses at the present time.

In conclusion, it may be said that tetra-nitro-aniline may prove itself useful in many other ways than those mentioned above. Considering all things, it would seem that it is a sufficiently promising explosive to warrant considerable experimentation to determine in just what way it may be of use to the naval service.

[21] The London Illustrated News, Dec. 26, 1914.



C. S. S. "Patrick Henry" (The Realistic War College)

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

A REALISTIC WAR COLLEGE

By J. M. MORGAN

In 1862 I ran the blockade at Charleston and proceeded to Europe, where I was detailed to the Confederate commerce destroyer (by some called *pirate*) *Georgia*. I was 16 years of age and a midshipman. I had been in many battles and considered myself a veteran—if experience in actual war makes a veteran I surely was one. I was away from the Confederacy for two years, and then, returning to my native land, ran through the blockade again, this time at Wilmington. When I received my new orders I hoped that I would at least find instructions to report aboard a small gunboat as a watch officer, for naval officers were scarce in the South. One can imagine my consternation and disappointment when I discovered that I was to be sent to school! I wondered if the Secretary of the Navy knew that I was all of 18 years of age, and that I was engaged to be married. I fretted and fumed, but now know that if there was one thing I needed more than another, it was a little schooling.

During my absence from the Confederacy a naval school for midshipmen had been established. One might well indeed ask where in the world the Confederate States could locate a naval academy? But the Southern naval officers were a resourceful lot, who could build gunboats in corn fields out of the yellow pine trees found in the neighborhood, and make armor out of rails and scrap iron; so to them a naval academy was a very simple thing to evolve. The Old Dominion Line side-wheel steamship *Patrick Henry*, which had formerly plied between New York and Norfolk, was lying at Richmond. She carried guns and was square rigged on her foremast, which would allow the midshipmen to be taught how to reef and furl sail. Two little pine board recitation rooms were erected on her hurricane deck between the paddle-boxes.

What more could be asked for in those days? Here was a fully-equipped naval academy ready to hand. Lieutenant William H. Parker, who before the war had been detailed as a professor of seamanship at Annapolis, was made superintendent of the new institution, and he was assisted by several naval officers and civilian professors who, in the face of many trials and difficulties, struggled in an effort to educate some forty or fifty lads, between the ages of 14 and 18, who were restlessly champing at the bit because they wanted to take a more active part in the fray which was going on around them. Among these boys was a young brother of Mrs. Jefferson Davis, a nephew of General R. E. Lee, a son of General J. C. Breckenridge, a son of Mr. Mallory, Secretary of the Navy; a son of Captain Semmes of Alabama fame, and many other scions of the most prominent families in the South.

One would think that the school should have been located in some quiet bend in the river, out of range of the shells of the contending forces, but there were no such places on that river; and besides, the Confederate naval officers were utilitarians, and the schoolship was a very important factor in the defence of Richmond. She was anchored at "Drury's Bluff," the main fortification on the river, situated about seven miles below the city. Through the obstructions in the river a passageway for our own boats had been left open. If the Union gunboats attempted to force their way through, as they had once before done, it was the appointed duty of the school to scuttle itself in this narrow channel. There were no defences on the river between "the Bluff" and Richmond, and should the enemy succeed in getting by the capital would have fallen. The *Patrick Henry* also served as a guard boat as well as a receiving ship, and all day signal men stood on top of her makeshift recitation rooms, thrashing the atmosphere with their little wigwag flags, sending and receiving messages from the naval land batteries located on the river below Drury's Bluff, one of which was continually engaged, night and day, in shelling the Dutch Gap canal which General B. F. Butler was engaged in digging. Opposed to these naval batteries were a number of strong fortifications on the north side of the river.

When prisoners were exchanged the flag of truce boats were always required to stop alongside the schoolship on their way to or from Richmond or Harrison's Landing (within the Federal lines), where the Union prisoners were delivered, and the Con-

federates embarked when released. I met with a mortifying *contretemps* on one of these occasions, when a cartel loaded with Confederate prisoners came alongside of the *Patrick Henry* and discharged her human freight on to our deck. They were a pitiful looking lot of human wrecks. I was busily engaged in assisting the officer of the deck in keeping the gang plank clear, as each poor fellow wanted to stop and have some conversation with the first men they had seen in gray uniforms for many months. Some of the poor fellows wanted news, and the more affectionate wanted to embrace me; but the executive officer, standing on the quarter-deck, had his eye on me, and I was compelled to be stern, as well as to repel their affectionate demonstrations. I was busily engaged repeating again and again: "Pass forward, my man; I will attend to you in a moment; but don't block the gangway—let these men come aboard," etc., when the raggedest and most forlorn looking of the lot approached me. His matted hair reached to his shoulders. His clothing was not only ragged, but dirty, and it was evident that he had not luxuriated in a bath tub for many a long week. There was a certain assurance in his manner as he approached which, despite his haggard and wretched appearance, should have warned me to be careful; but, as I have said before, I was busy. The poor fellow asked me very politely "who was in command of the *Patrick Henry?*" and I replied with the stereotyped, "Pass forward, *'My Man'*; don't block the gangway!" His sad eyes suddenly blazed in indignation, and to my consternation the dilapidated looking creature drew himself up and with suppressed wrath said: "Mr. Morgan, I will apply for you when I get a ship, and I will show you, sir, who goes forward! I am Commander Kennon!"

I had known Commander Kennon well when I served in the same flotilla with him on the Mississippi in 1861-2. To say that I was mortified faintly describes my feelings when I realized that I had ordered a commander "forward." If the deck had opened and let me drop into the coal bunkers, where my embarrassment would not have been so conspicuous, I would have been grateful. The last time I had seen Kennon was when he was in command of the old sidewheel steamer *Governor Moore,* with which he rammed and sunk the U. S. sloop-of-war *Varuna* when Admiral Farragut passed the forts below New Orleans. Immediately after he struck the *Varuna,* the *Hartford, Brooklyn,* and the frigate

Mississippi closed in on him and shooed him ashore with their heavy guns. They set fire to the *Governor Moore* and blew her up almost instantly. The last the Confederates saw of Kennon he was struggling in the river. Now I submit that by all the rules of the game, after not hearing of him for more than two years, I had a right to suppose that he was dead, and I do not think it was right for him to come back in disguise to confound a poor midshipman who was obeying orders and trying to do his duty. Several years after this *contretemps* I again served with Kennon, this time in the Egyptian army, and he seemed to take a fiendish delight in recounting to the army officers how he was once ordered "forward" by a "d—d midshipman!"

Life at that naval academy was necessarily one of privation. The clothing of the midshipmen was made of the coarsest materials. We slept in hammocks slung as closely together as sardines in a box. Our food was scanty and unappetizing—a little lump of fat pork or a slither of meat which from its toughness aroused the suspicion that it had been carved from very close to the horns of some half-starved animal, a "hardtack," generally infested with weevils or worms, to be washed down by a tin cup full of hot water colored with chicory or burnt grains of ground corn. This decoction was brevetted coffee. There was no variety—the same menu served for breakfast, dinner and supper. But if we were short on rations, we had plenty of excitement to make us forget the emptiness of our stomachs. Drills, study and recitations went on continually, the latter punctuated by the booming of the guns and the bursting of the shells. A section of midshipmen with camp stools under their arms would enter a recitation room where would be seated the professor on a rough cane-bottom chair. He would order one of the youngsters to "take the blackboard," and commence the business of the hour by giving out the problem, "If x equal 10," but frequently he got no farther before a crashing of great guns aroused his curiosity and he would request one of the young gentlemen to step outside and see which one of the batteries was using a particular rifle gun or a heavy smoothbore. Having received the information, he would attempt to resume the recitation, when he would again be interrupted by a message from the captain to send two or three midshipmen to assist in working the guns of some battery which was short of officers. After the artillery duel was over these boys would return to the ship and

continue their studies. On other occasions they would be detailed to go down the river and assist in laying mines and anchoring spar torpedoes. The bushes on the bank of the river were infested with sharpshooters. Then there were expeditions in small boats to cut out Federal warships and carry them by boarding, as they succeeded in doing on several occasions. It was useless to ask for volunteers, as every midshipman on the *Patrick Henry* would clamor for permission to go, so these details were given as rewards for good conduct.

For the expedition to board the U. S. gunboat *Underwriter*, lying in Albemarle Sound, a number of midshipmen were fortunate enough to get details, among them Daniel M. Lee, a younger brother of Fitzhugh Lee, and Palmer Saunders. It was moonlight the night of the attack, but the clouds obscured the moon. With muffled oars the Confederate row-boats approached the doomed craft, and before they were discovered they were so close that the broadside with which the warship had intended to annihilate them passed harmlessly over their heads. Lee and Saunders were in the same boat and boarded at the gangway, where a Jacob's ladder had been left hanging against the side. Saunders tripped gayly up the ladder, only to meet a sailor armed with a cutlass; this the man brought down on the poor boy's head with such terrific force that it literally split his skull into two parts, one-half of his head resting on his shoulder as he dropped dead and fell into his boat. Lee, who was closely following Saunders, leaped lightly onto the deck and tackled a sailor at close quarters. The sailor threw him down and fell on him. The sailor was trying to use his weapon, but Lee was holding him so tightly he could not manage it. Some Confederates rushed to Lee's assistance, and one of them placed the muzzle of a navy revolver against the Yankee sailor's back and was about to pull the trigger when Dan Lee called out: "Don't shoot, you fool! Can't you see how thin this man is? I am under here!" Those who know Lee believe that he would have had his joke even if the man's cutlass had been in him.

The conflict on the deck of the *Underwriter* was brief and bloody. Her crew made a gallant fight for their ship, but were assailed from all sides, and to add to their difficulties, the *Underwriter* was on fire. Wounded and prisoners were put into the boats, and the gunboat was left to her fate. The midshipmen of the expedition, with the exception of the much-loved Palmer

Saunders, returned to their school, where they resumed their studies while awaiting another opportunity to show their metal.

I remember one morning that, shortly after daylight, we received the information that a portion of General Grant's army had surprised and captured Fort Harrison, which was situated on the north side of the river, about two miles from where we lay. Fort Harrison was one of the most important defences on that line of fortifications. About 7 o'clock in the morning we discovered that a pontoon bridge was being thrown across the river a short distance above where we lay. The bridge was soon completed, and then we saw Hoke's famous division crossing it. These were the best dressed soldiers in the Confederate army, as the State of North Carolina had the forethought to buy for itself several blockade runners, which kept their troops decently clothed.

It was evident to all of us that our soldiers were going to try to retake Fort Harrison. Several of the midshipmen, myself among the number, obtained permission to accompany the troops so that we could see the fight to greater advantage. Arriving at the selected spot, Hoke's division was drawn up in line of battle. We were within range of the enemy's artillery, but not a shot was fired at us while the formation was going on. We were much pleased at this, as we thought it showed weakness. No sooner had our line completed its formation than it opened at intervals to allow batteries of light artillery to pass to the front. At the gallop they went for several hundred yards, and then, wheeling, they unlimbered and opened fire. Soon the smoke was so dense that we could no longer see them, and then suddenly the firing ceased and they burst through the smoke on their way back to us. All of this time Fort Harrison and its outlying fortifications were ominously silent. As soon as our artillery had repassed through our lines, the infantry received the order to move forward, and shortly afterwards came the command to charge. The ear-splitting rebel yell rent the air as the gallant fellows rushed at the works, but, alas! as they got within a hundred yards or less of the fort, out of the bushes and undergrowth a long line of bluecoats arose and poured a withering fire into the ranks of our men, while the great guns of the fort sprinkled grapeshot and canister among them. Soon we midshipmen saw a few skulkers and slightly wounded men coming to the rear, and then the whole line seemed to suddenly give way and they fell back, but not in much disorder. When we

reached the point from which we had started, the division was reformed, and suddenly the men burst into cheers. At first we could not understand what had caused the wild outbreak of enthusiasm, but soon we saw a stately figure mounted on a white horse coming down the line. It was General R. E. Lee! As he passed near where we were standing we could distinctly hear him telling the men that they " must retake that position for him, as it was the most important on the line, and he was sure they could do it if they would only try."

Again our artillery roared, and under cover of the smoke we again advanced, only to meet with a similar reception to that given us on the first attempt. Again we came back, but in somewhat greater disorder than on the previous occasion. Again they reformed at the same place, and again General Lee, hat in hand, his splendid silvery head uncovered, rode down the line imploring his men to make one more effort for him. I had always had the idea that General Lee was a cold, unemotional man, but he was excited that day—even the staid and stately " Traveller," his warhorse, was prancing. Well, to cut the story short, we advanced for the third time on the works which had been ours but were now in the possession of the enemy. The charge was not as enthusiastic as the two previous ones, and when our men were again repulsed they broke and fled in disorder. I may have been a web-footed sailor, but I did not notice any infantrymen pass me on the way back to our second line of defence.

As soon as the division reformed General Lee again rode down the line, thanking his troops for their gallant effort and begging them not to be downhearted over their failure, as they had done all that it was possible for men to do, and that anyhow the position was not as important as he had at first thought it was.

On our way back to the ship a " sawbones " caught one of the middies and made him hold a wounded man's leg while he (the surgeon) cut it off.

As the sun went down we midshipmen returned to our school and chills and fever—not fashionable " malaria," but regular old-time chills and fever, which first made the agonizing tremors pass through the frame and the teeth chatter and rattle, the chill only to be allayed by the heat of a burning fever, which always followed it. The mouth became parched and the dry tongue clove to the roof of the mouth. In those days it would have been considered a crime

to give a sufferer from fever a drop of cool water! It was my day and hour for a chill, so I sought out a quiet place on the deck, where the planks looked soft, and lay down to shake it off. This performance was not included in the routine of the ship, but it was as regular as the beat to general quarters. As we slept in hammocks and they were stowed away in the daytime, we were allowed to lie down any place where we did not interfere with the routine of the ship. With the exception of some of the boys from the alligator states, most of us were sufferers from this cause, and many of them were also weakened from chronic dysentery brought on by the bad food they had to eat; but simple chills and fever was never considered of sufficient importance to allow one to be excused from either duty, lessons or drills.

In the autumn I passed my examination and was promoted to the dignity of passed midshipman. I received my orders with delight, as they did not take me far away from Richmond. I was sent to a perfect inferno, a naval battery called "Semmes," situated on a tongue of land formed by the river, and in a semi-circle, completely enfilading it, were the Bohler, Signal Hill, the Crow's Nest, Dutch Gap and Howlet House batteries. All day the big guns boomed and all night the mortar shells exploded; but I could get away on Saturday evenings and spend a night in town, so what did I care, at my age, for the inconveniences of the rest of the week?

The winter of 1864-5 was a very cold one, and the snow lay deep on the ground for most of the time. When the early spring at last arrived my commanding officer surprised me by ordering me to report to the Secretary of the Navy, and advised me to take my belongings with me. As I had none besides the clothes, ragged and torn, I stood in, and my sword and pistol, which I always wore, it did not take me very long to pack my effects.

While trudging along through the mud on my way to Richmond I very seriously pondered over all my sins of commission and omission, as I could not understand why a Secretary of the Navy would want to see a passed midshipman unless it was for the purpose of giving him a reprimand(?). Judge of my surprise when I was ushered into the august presence of the, so far as I was concerned, all-powerful man, and he simply informed me that I was to accompany Mrs. Jefferson Davis's party south. It then suddenly dawned upon me that the Confederate cause was doomed and that Richmond was about to fall.

Mrs. Davis's party consisted of herself, her children, her sister, Miss Howell; three daughters of Mr. Trenholm, Secretary of the Treasury; Colonel Burton Harrison, Mr. Davis's private secretary, and myself. We boarded a train at the station and the President joined us there to bid good-bye to his family. The train stopped every few miles to let troop trains pass by, and it was a wearisome and uncomfortable journey. The news of the fall of Richmond caught up with us on the way, and when we at last arrived at Charlotte, N. C., nothing could induce Mrs. Davis to go a foot farther until she could hear from her husband.

The superintendent of the Confederate States Naval Academy was among the very last to be informed that Richmond was being evacuated. This information was conveyed to him in an order directing him to land the midshipmen, blow up the schoolship, and proceed south with his command. The midshipmen had not proceeded very far on their way to Richmond before they heard the magazines of their late home tearing the old ship into atoms, and as they trudged along the river bank one terrific explosion after another shook the ground under their feet as the ironclads were destroyed. Arriving in Richmond, they found the gutters running with whiskey which the frightened inhabitants had attempted to destroy in that way to keep it from falling into the hands of the Federal soldiers—instead of which, much of it went down the guzzles of a mob composed of the riffraff of the city, skulkers, deserters and dazed negroes. The midshipmen, marching like the veterans they were, crossed the bridge to Manchester, where they were to entrain for the south.

On arriving at the railway station they found the officials of the Treasury Department in a great state of trepidation, owing to the fact that they had under their charge all the gold belonging to the Confederacy—some half a million of dollars. The mob had learned of it, and were rapidly gathering with the object of looting, and not a soldier in sight to afford them protection. When the mob saw a lot of young boys with guns file onto the platform alongside the train that was to carry the kegs of specie they cheered derisively. Captain Parker ordered his command to fix bayonets, and in less time than it takes to tell, had cleared the station of that crowd of ruffians. Putting the gold on the train with his midshipmen in charge of it, he pulled out of the station, bound he did not know where.

At Charlotte it was learned that General Sherman's troops were approaching from several directions, and that there was grave danger of Mrs. Davis falling into their hands. It was decided that with the treasure she should leave at once under the protection of the midshipmen. They went as far as Chester, S. C., and detrained there, the specie being loaded on commandeered wagons, in which Mrs. Davis and her family also rode—a midshipman guard on foot preceding and following, as well as marching on each side of, the unique train; and thus they plodded on their weary way over the wretched country roads.

When night overtook them at the end of their first day's journey they found shelter in a rough, pine-board, wayside church, where Mrs. Davis and her little children slept on the bare floor. Captain Parker, as commanding officer, spent the night in the pulpit, and the middies who were not on guard lay their wearied young bodies down anywhere and went to sleep.

Day after day this peculiar cavalcade continued its march, in all kinds of weather, over those roads which one moment were ankle deep in mud or sand, and the next so stony that the unshod mules were lamed and the feet of the midshipmen were cut and bruised—there was hardly a sole left to a shoe in the command, and many of the youngsters had no shoes at all before they reached the end of their tramp. Throughout this trying journey Captain Parker attests that he never heard a single complaint uttered by any one in the command. The long marches were very trying on another account. Constant vigilance had to be maintained, as on their flanks were constantly hovering gangs of deserters watching for an opportunity to swoop down on the coveted booty.

It was impossible for Mrs. Davis to obtain shelter at any house, as the natives feared that "the Yankees" would destroy their property if they heard she had received hospitality. When finally she arrived in Abbeville, Colonel Armistead Burt put his house at her disposal, and when she declined his kind offer, telling him that "if she accepted his hospitality she feared his house would be burned," the noble old aristocrat made her a profound bow, saying: "Madam, I know of no better use my home could be put to than to be burned in such a cause!"

The midshipmen left Mrs. Davis at Abbeville and resumed their march to Augusta, Ga., still escorting the gold. Augusta was only eighty miles away, and when they arrived there it was to learn that

the place was being evacuated and that they must get away from there as quickly as possible. So back to Abbeville they tramped.

Captain Parker was determined, if possible, to put that gold into the possession of Mr. Davis, but when he returned to Abbeville Mr. Davis had not yet arrived. But Mr. Mallory, the Secretary of the Navy, had and he ordered the gold turned over to the tender care of the soldiers, and also ordered the Confederate States Naval Academy disbanded! Each midshipman received a copy of the following order:

ABBEVILLE, S. C., May 2, 1865.

SIR: You are hereby detached from the naval school, and leave is granted to visit your home. You will report by letter to the Hon. Secretary of the Navy as soon as practicable.

Paymaster Wheless will issue you ten days' rations, and all quartermasters are requested to furnish you transportation.

Respectfully your obedient servant,

(Signed) WM. H. PARKER,
Commanding.

It was in this way that these ragged and weary boys were turned loose on the world. Many of them were a thousand miles from their homes. The homes of others had been destroyed. The quartermasters who were expected to furnish transportation immediately became invisible, as they had already fled in an effort to save themselves, and could they have been found, Sherman's army had destroyed the railroads which were to furnish the transportation. It was a tragic ending for a unique institution of learning.

One might ask what became of the men who received their only education under such extraordinary circumstances. The answer is that the after careers of many of these boys would compare favorably with that of many youths graduated from the most celebrated universities. They became lawyers, doctors, civil engineers, planters, bankers, and business men. Several of them became millionaires. Three of them became judges; one a distinguished member of Congress; several were members of state legislatures; and two of them were afterwards captains of large merchant ships. Two of them became mayors of great seaport cities, and one of them was appointed United States Consul General to Australia, while still another one was a United States Minister to Russia.

One interesting incident in the careers of three of these little midshipmen who were together on the schoolship *Patrick Henry*,

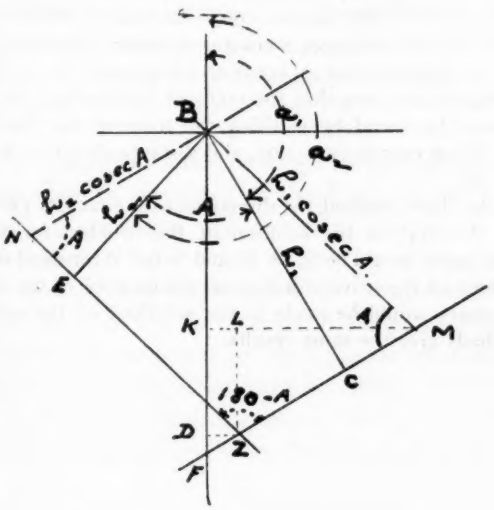
and whose combined capital at that time probably would not have exceeded 15 cents in Confederate money (and gold was at a 100 for 1 premium), occurred when they met some thirty years afterwards on a commission to settle the long litigated question concerning the debt due bondholders by the States of "old" Virginia and West Virginia. One of them was Clarence Cary, of the prominent law firm of Cary & Whitridge, representing Brown Brothers and the bondholders of the North; another was Bartlet Johnson, banker and broker, representing the bondholders of Baltimore and that section of the business world; and the third was Virginius Newton, president of a great national bank and representing the interests of the Virginia and Southern bondholders. It is true that there were only a score or two of millions involved, but it goes to show the prominence achieved in the business world by some of the graduates of the Confederate States Naval Academy.

DISCUSSION

Calculating Intersection of St.-Hilaire Lines of Position

(See Page 481 of this Number)

Commander J. F. Hines, U. S. Navy.—The rule "to 'swing' the azimuths to the adjacent quadrants" as stated on page 485, and to reverse the columns of the traverse tables as required in the last paragraph of page 486, may be a "rule of thumb" to obtain the result, but it does not show the "reason why."



From the figure given above, the deductions of the same formulæ are clearer and simpler and at the same time the reasons for the operations are apparent.

After having found the azimuths and then the directions (a_1 and a_2) of the altitude differences, and their values (h_1 and h_2); and after having plotted them and their lines of position—draw through the assumed point (B), the lines BM and BN, parallel to the lines of position—thus forming the parallelogram $BMZN$.

The quadralateral $BCZE$ is formed by the altitude differences (h_1 and h_2) and their lines of position.

In the quadralateral $BCZE$

angle CBE = difference in direction of h_2 and h_1
$= a_2 - a_1 = A$

angle $CZE = 180° - A$

In the parallelogram $BMZN$

$$\text{angle } MZN = 180 - A \text{ and}$$
$$\text{angle } BMZ = BNZ = A$$
$$\text{side } BM = h_1 \operatorname{cosec} A$$
$$\text{side } MZ = \text{side } BN = h_2 \operatorname{cosec} A$$
$$\text{direction of } BM = a_2 - 90^\circ$$
$$\text{direction of } MZ = a_1 + 90^\circ$$

Difference in Lat. between B and Z

$$= BK + KD$$
$$= BM \cos(a_2 - 90) + MZ \cos(a_1 + 90)$$
$$= h_1 \operatorname{cosec} A \sin a_2 + h_2 \operatorname{cosec} A \sin a_1$$
$$\text{D. Lat.} = \operatorname{cosec} A (h_1 \sin a_2 + h_2 \sin a_1)$$

Departure between B and Z

$$= MK - ML = KL = DZ$$
$$= BM \sin(a_2 - 90) - MZ \sin(a_1 + 90)$$
$$= h_1 \operatorname{cosec} A \cos a_2 - h_2 \operatorname{cosec} A \cos a_1$$
$$\text{Dep.} = \operatorname{cosec} A (h_1 \cos a_2 - h_2 \cos a_1)$$

From the figure it is seen that the point of intersection of the two lines of position may be found by working the traverse for the distance BM ($= h_1 \operatorname{cosec} A$) on course ($a_2 - 90$), and distance MZ ($= h_2 \operatorname{cosec} A$) on course ($a_1 + 90$).

Following the above method, the directions of the factors ($h \operatorname{cosec} A = 9.5$ and $h \operatorname{cosec} A = 7.4$) in the solution of the problem on page 6 of the accompanying paper would be S. 48° E. and S. 60° W. instead of those given, and the columns of the traverse tables would be used in the usual manner.

Similar changes would be made in the solutions of the other problems, but both methods give the same results.

U. S. NAVAL INSTITUTE

SECRETARY'S NOTES

Annual Dues

The annual dues for 1916 became payable on January 1, 1916. It is suggested that dues be paid in lump sums covering a period of two to five years; this method of payment has advantages for members as well as for the Institute and is practised by a number of members, both regular and associate. Response to this notice will save the Institute a considerable sum in stationery and postage. Beginning January 1, 1916, members residing abroad permanently or for any length of time will be charged postage at the rate of fifty cents a year.

Special Notice

It is believed that the scope of usefulness of the PROCEEDINGS to members of the Institute can be increased and all members are invited to assist in this work. Should any topic occur to you on which you think an article could well be written, or on which you would like to read one, send such topic to the Secretary and Treasurer, together with such explanation or comment as may appear desirable in order that the intent of the suggestion may be clearly understood. The Institute is desirous of obtaining good "sea yarns" for publication. It is hoped that anyone who can spin such a yarn will submit it.

References

Attention is invited to the following articles which have appeared in the pages of the PROCEEDINGS during the past two years; they treat of subjects which closely concern Naval War College work; a perusal of them should prove profitable:

1914

War and Policy. By Captain J. S. McKean, U. S. N.; page 1, Whole No. 149, June, 1914.

Moral Training in Preparation for War. By Charles M. Bakewell; page 157, Whole No. 149, January, 1914.

The Great Lesson from Nelson for To-day. By Lieut. Commander D. W. Knox, U. S. N., P. E., page 295, Whole No. 150.

Naval Policy as it Relates to the Shore Establishment and the Maintenance of the Fleet. By Captain John Hood, U. S. N., H. M., 1914; page 319, Whole No. 150, March, 1914.

Details of Navy Department Administration: Navy Department Policies. By Lieut. Commander N. L. Jones, U. S. N.; page 377, Whole No. 150, March, 1914.

Military Preparedness. By Naval Constructor Richard Gatewood, U. S. N., H. M., 1914; page 631, Whole No. 151, May, 1914.

What Should be the Relations Between Battle and Reserve Fleets. By Captain W. S. Sims, U. S. N.; page 727, Whole No. 151, May, 1914.

Old Principles and Modern Applications. By Dudley W. Knox, U. S. N., H. M., 1914; page 1009, Whole No. 152, July, 1914.

The Battle of the Sea of Japan: Translation Japanese General Staff Report. By Captain W. T. Hoadley, U. S. Marine Corps; page 961, Whole No. 152, July, 1914.

Some Foreign and Other Views of War and the Study and Conduct of War. By Captain Albert Gleaves, U. S. N.; page 1301, Whole No. 153, September, 1914.

Strategic Problems and Their Solution. By Captain R. von Labres, I. G. N. Translated by Surgeon J. F. Leys, U. S. N.; page 1409, Whole No. 153, September, 1914.

1915

Employment of Torpedo Vessels in Night Search. Translation. By Lieut. Commander W. N. Jeffers, U. S. N.; page 89, Whole No. 155, February, 1915.

Extracts from Mahan's Naval Strategy. By Lieutenant W. T. Lightle, U. S. N.; page 155, Whole No. 155, February, 1915.

The Rôle of Doctrine in Naval Warfare. Prize Essay. By Commander Dudley W. Knox, U. S. N.; page 325, Whole No. 156, April, 1915.

Naval War College Principles and Methods Applied Afloat. By Captain W. S. Sims, U. S. N.; page 383, Whole No. 156, April, 1915.

The Work Ahead of Naval Aviation. Lieutenant R. C. Saufley, U. S. N.; page 505, Whole No. 156, April, 1915.

An Air Fleet, Our Pressing Naval Want. By Commander T. D. Parker, U. S. N.; page 709, Whole No. 157, June, 1915.

The Estimate of the Situation. By Rear Admiral Austin M. Knight, U. S. N.; page 765, Whole No. 157, June, 1915.

The Control of Fleets in Action. By Lieutenant H. H. Frost, U. S. N.; page 1053, Whole No. 158, August, 1915.

Naval Scouts. By Commander Ralph Earle, U. S. N.; page 1099, Whole No. 158, August, 1915.

Peace or War? By Commander A. W. Hinds, U. S. N.; page 1409, Whole No. 159, October, 1915.

Battle Tactics. By Lieutenant R. A. Dawes, U. S. N.; page 1873, Whole No. 160, December, 1915.

Bureau of Information

The Institute offers its services as a "Bureau of Information" on professional questions and will endeavor to obtain replies from the best qualified sources. Those "Questions and Answers" which are suitable for purposes of general information, will appear in the PROCEEDINGS. It is suggested that knotty questions which come up in professional examinations for promotion may well be submitted to this department.

Membership

Since January 20, 1916, 25 regular, 7 associate and 1 life members have joined the Institute. 12 members resigned. The following members have died:

Asst. Surgeon P. I. Mulholland, N. M. Ohio.
Rear Admiral A. S. Barker, U. S. Navy, Retired.
Mr. J. C. Schwab.
Rear Admiral Asa Walker, U. S. Navy, Retired.
Mr. Fred T. Jane.
Lieutenant Ridgely Hunt, U. S. Navy, Retired.

Notice

Whole Nos. 145, 147, 149 and 155 of the PROCEEDINGS (March, 1913, September, 1913, January-February, 1914, and January-February, 1915) are exhausted; there are so many calls for single copies of these numbers that the Institute officers to pay for copies thereof returned in good condition at the rate of 25 cents per copy.

Address of Members

Members, especially those on the retired list, and civilians are urged to keep the Secretary and Treasurer informed of the address to which PROCEEDINGS are to be sent, and thus insure their receipt.

Book Department

The Institute Book Department will supply any obtainable book, of any kind, at retail price, postage prepaid. The trouble saved the purchaser through having one source of supply for all books, should be considered. The cost will not be greater and sometimes less than when obtained from dealers. Bills will be rendered upon delivery of books.

Non-receipt of Proceedings

Members and subscribers are urged to notify the Secretary and Treasurer promptly of the non-receipt of PROCEEDINGS, in order that tracers may be started. The issue is completed by the 10th of the even numbered month.

Reprints of articles

The attention of authors of articles is called to the fact that the cost to them of reprints other than the usual number furnished, can be greatly reduced if the reprints are struck off while the article is in press. They are requested to notify the Secretary and Treasurer of the number of reprints desired when the article is submitted.

Notice to Newsdealers

The discount to newsdealers is now 10 per cent, instead of the 25 per cent heretofore allowed on subscriptions.

The edition of "The Elastic Strength of Guns," by the late Professor P. R. Alger, U. S. Navy, printed under date of 1916, being exhausted, the opportunity offered by the necessity of its again going to press was utilized to add two chapters, some twenty pages in all, of descriptive matter relating to gun design. A general discussion of the factors entering into gun design, their interrelations, co-ordination with the text, and their final adjustments, together with the results of the actual computations for the 12-inch 50 caliber gun and a diagram showing its pressure and strength curves have thus been included in the 1916 edition. These chapters are the work of Lieutenant (j. g.) R. K. Turner, U. S. Navy, a post graduate student in Ordnance, now at the Naval Gun Factory.

Awards in Prize Essay Competition

Lieutenant (j. g.) H. H. Frost, U. S. Navy, has been awarded the prize, his essay being on "The Moral Factor in War." Lieut. Commander J. K. Taussig, U. S. Navy, first honorable mention, essay, "Naval Personnel." The late Lieutenant Ridgely Hunt, U. S. Navy, second honorable mention, essay, "Education at the Naval Academy." Commander Dudley W. Knox, U. S. Navy, third honorable mention, "Some Underlying Principles of Morale."

Journal of the United States Artillery

By arrangement with the manager of the Journal of the U. S. Artillery, we offer to members of the U. S. Naval Institute other than officers of the Coast Artillery, U. S. Army, a reduced rate on subscriptions to the Journal of the United States Artillery, as follows:

United States, Cuba, and Mexico, $1.75; Canada, $2.00; other countries, $2.25; and club rates to subscribers to the PROCEEDINGS, other than officers of the Coast Artillery, U. S. Army, as follows: United States, Cuba, and Mexico, $4.50; Canada, $5.00; other countries, $5.50. Good only on new or renewal subscriptions, when sent to the same address.

ANNAPOLIS, MD., March 16, 1916.

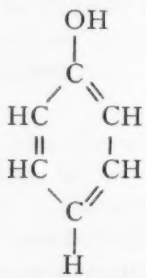
CORRECTION

Diphenylamine

(See Page 125, Whole No. 155, January-February, 1915)

It is desired to correct two errors which have crept into the above mentioned article since it left the writer's hands.

On page 127, the graphic formula for phenol should be



instead of as shown.

On page 128, the graphic formula for hexanitrodiphenylamine should have two bonds between the carbon atoms in the 3—4 positions of the upper phenyl group. The construction of the two phenyl groups should be the same.

Even though one can readily see that these are errors of printing, it is believed advisable to call attention to them, so there cannot be any question as to the accuracy of the original article.

W. W. Bradley, Jr.

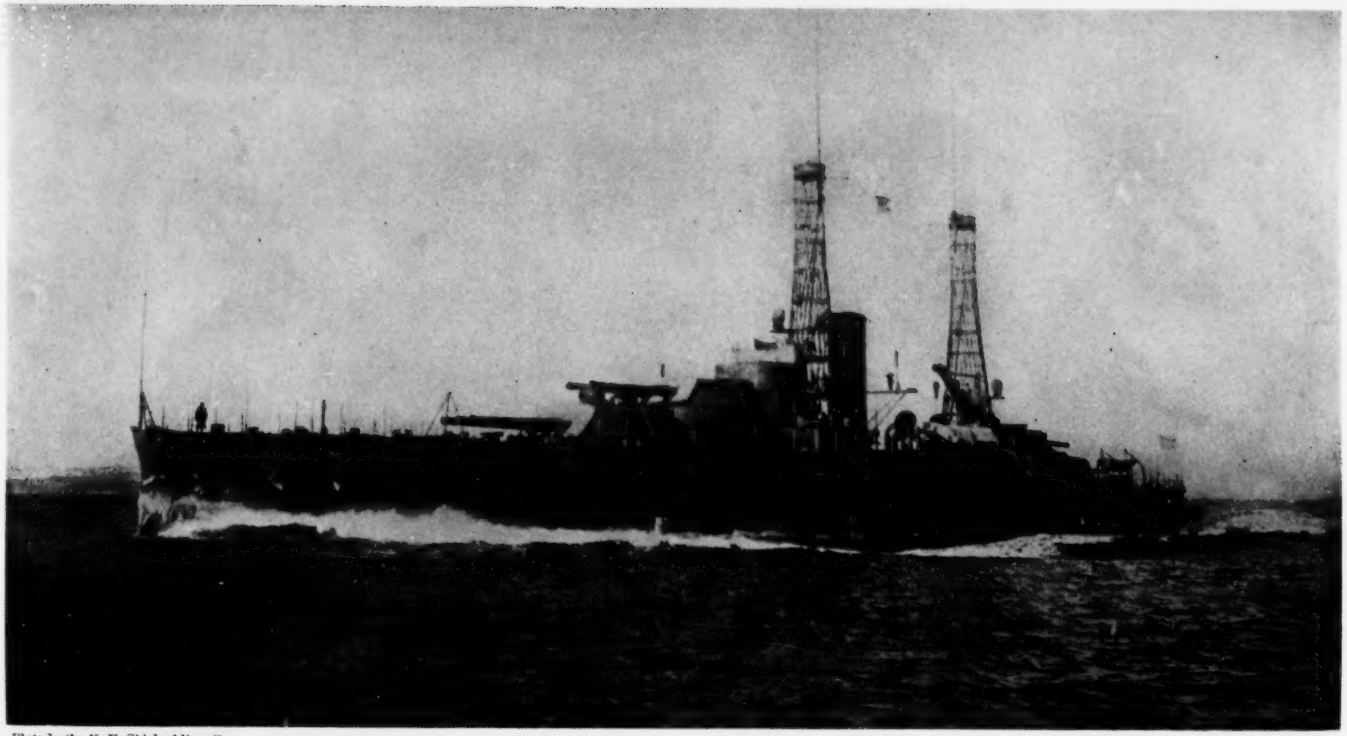


Photo by the N. Y. Shipbuilding Co.

THE U. S. S. BATTLESHIP "OKLAHOMA," 27,385 TONS DISPLACEMENT, MOUNTING TEN 14-INCH GUNS, STEAMING AT THE RATE OF 21.47 KNOTS ON THE MEASURED MILE OFF ROCKLAND, ME., JANUARY 15—HER SISTER SHIP, THE "NEVADA," RAN HER BEST MILE AT THE RATE OF 21.04 KNOTS—THE "OKLAHOMA" HAS RECIPROCATING ENGINES AND THE "NEVADA" HAS CURTIS TURBINES—BOTH SHIPS ARE OIL-FIRED EXCLUSIVELY

Photo by the N. Y. Shipbuilding Co.

THE U. S. S. BATTLESHIP "OKLAHOMA," 27,385 TONS DISPLACEMENT, MOUNTING TEN 14-INCH GUNS, STEAMING AT THE RATE OF 21.47 KNOTS ON THE MEASURED MILE OFF ROCKLAND, ME., JANUARY 15—HER SISTER SHIP, THE "NEVADA," RAN HER BEST MILE AT THE RATE OF 21.04 KNOTS—THE "OKLAHOMA" HAS RECIPROCATING ENGINES AND THE "NEVADA" HAS CURTIS TURBINES—BOTH SHIPS ARE OIL-FIRED EXCLUSIVELY

PROFESSIONAL NOTES

Prepared by LIEUTENANT C. C. GILL, U. S. Navy

GENERAL ARRANGEMENT

	PAGE
NAVAL POWERS:	
* Argentine	564
* Austria	564
* Brazil	564
* France	565
* Germany	565
* Great Britain	567
* Holland	572
* Italy	573
* Japan	573
* Portugal	574
* Russia	575
* Spain	575
* United States	576
* Order of sub-topics under the powers { vessels building, battleships, cruisers, destroyers, submarines, auxiliaries, personnel, naval policy.	
NAVIGATION	600
ORDNANCE AND GUNNERY:	
Guns	602
Explosives	603
Projectiles	605
ENGINEERING	609
SUBMARINES	610
AERONAUTICS	615
RADIO	617
CANALS	618
MISCELLANEOUS	619
CURRENT NAVAL AND PROFESSIONAL PAPERS	624

NAVAL POWERS

ARGENTINE REPUBLIC

A notable evidence of the splendid work accomplished by American shipbuilders is seen in the final acceptance of the superdreadnoughts *Moreno* and *Rivadavia* by the Argentine Republic, announced in the following cable received February 21 by President Powell, of the Fore River Shipbuilding Company, of Quincy, Mass.: "Guarantee of one year in full active service, superdreadnoughts *Rivadavia* and *Moreno*, now expired, and both warships are accepted by Argentine Republic as thoroughly conforming to all specifications. Turbines have worked without hitch, each vessel having covered over 15,000 knots." Under the terms of the contract as originally taken by the Fore River Company the superdreadnoughts were not unconditionally accepted by the South American republic. They must first show by a year of actual use that they conformed in every way to the specifications required. This year's test was in the nature of a guarantee by the Fore River firm. After the vessels completed their trial trips in the north they sailed for home waters in charge of the Argentine crews. A guarantee engineer went with them, however, to report on the success of the superdreadnoughts during their year in commission. Señor Valiente, Argentine Minister of Marine, praised them as "a remarkable work of naval architecture, honoring American industry." The time period for the *Rivadavia* expired December 18, 1915, and that for the *Moreno* February 21, 1916. The company's representative at Bahia Blanca then sent the cablegram announcing the complete success of the American-built warships. In the past year the *Rivadavia* and *Moreno* have visited every important port of Argentina and have been accorded ovations wherever they have gone. H. E. D. Gould, the guarantee engineer, estimates that the *Rivadavia* was visited by more than 750,000 people at these ports.—*Army and Navy Journal*, 3/4.

AUSTRIA

VESSELS BUILDING

Name	Displacement	Speed	Armament	Builders	Remarks
Battleships					
Ersatz Mon'ch	24,500	22½	10 14-in.	Trieste	Laid down, 1914
" Budapest	24,500	22½	same	"	" " 1914
" Wien....	24,500	22½	same	Fiume	" " 1914
" Hapsburg	24,500	22½	same	Trieste	" " 1915
VESSELS BUILDING IN JULY, 1914, AND NOW COMPLETED					
1 Battleship					
Szent Istvan..	20,010	20	12 12-inch	....	Completed in 1914
5 Light Cr'sers					
Saida Class ...	3,454	27	9 4.1-in., 2 6-pdrs.	....	Completed in 1914-15

Note.—Approximately 24 torpedo boats and six submarines were building in July, 1914. Official information regarding naval matters being unobtainable since the outbreak of war, it may be assumed that ship yards have been kept busy to their utmost capacity, and that new vessels have been laid down as fast as those building have been completed.

BRAZIL

The submarine mother ship *Ceara*, building in Italy for Brazil, is 326 feet long, 51 feet in beam, and displaces 3735 tons, her armament consisting of four 3.9-inch and four 2.2-inch guns. She has been designed with the object of discharging the duties of parent ship to a flotilla of six 250-ton sub-

marines, and in addition to her storage, repair and hospital facilities, is fitted for docking a submarine up to 180 feet in length and 23 feet beam. She is also fitted with salvage apparatus, and is theoretically able to lift a 250-ton submarine from a depth of 132 feet in thirty minutes.—*Army and Navy Journal*, 3/4.

FRANCE

VESSELS BUILDING

Name	Displacement	Speed	Armament	Builders	Remarks
Battleships					
Languedoc	24,828	21.5	12 13.4-in., 24 5.5-in.	La Seyne	Laid down April 28, 1913
Normandie	24,828	21.5	same	St. Nazaire	" July 5, 1913
Flandres	24,828	21.5	same	Brest	" Oct. 10, 1913
Gascogne	24,828	21.5	same	Lorient	" Oct. 1, 1913
Bearn	24,828	21.5	same	La Seyne	Contract Jan. 7, 1914
VESSELS BUILDING IN JULY, 1914, AND NOW COMPLETED					
3 Battleships					
Bretagne class.	23,172	20	10 13.4-inch	....	Completed in 1915

NOTE.—There are approximately six destroyers and 23 submarines under construction. (Lack of information since outbreak of war has made it impossible to correct table to date.)

In July, 1914, France had building approximately 3 destroyers and 22 submarines.

Since the outbreak of war it is probable that France has increased her construction program to the extent permitted by the building facilities.

GERMANY

VESSELS BUILDING

Name	Displacement	Speed	Armament	Builders	Remarks
Battleships					
Ersatz Worth	29,000	....	8 15-in., 16 5.9-in.	Kiel	Laid down Sept., 1913
"T" 1913	29,000	....	same	"	" May, 1913
Ersatz Friedrich III	30,000	....	8 15-in., 18 5.9-in.	....	" summer 1914
Cruisers of the Line					
Ersatz Hertha	28,000	28.5	8 12-in.	Wilhelmshaven	Laid down July, 1913
Ersatz Victoria Louise	.....	....	....	....	" summer 1914
VESSELS BUILDING IN JULY, 1914, AND NOW COMPLETED					
4 Battleships					
Grosser Kurfürst class	25,388	22	10 12-inch	....	Completed in 1914-15
2 Battle Cr's'rs					
Derffinger class	28,000	27	8 12-inch	....	" " "
5 Light Cr'sers					
Ersatz Hela class	5,500	27.5	10 6-inch	....	" " "

NOTE.—In July, 1914, Germany had building approximately 24 destroyers and 18 submarines.

No accurate information regarding naval matters has been obtained since the outbreak of the war, but it is reported that ship construction has been pushed to the full extent of building facilities.

SUBMARINE MONITORS.—While the British Navy has built and commissioned a new type of big-gun surface monitor and also a new type of ship for mine and anti-airship work, the Germans, according to Mr. Archibald Hurd, of the London *Daily Telegraph*, have launched new large submarine monitors, each equipped with a powerful battery and protected by armor which can be made completely watertight. These vessels, Mr. Hurd says, are of great speed and can utilize their armored battery just above the water. If a British warship appears the monitors quickly are submerged.—*Army and Navy Journal*, 19/2.

THE HELIGOLAND.—The late Marquis of Salisbury, strong and dominant British Minister as he was, suffered from the defects of his qualities, in that he was human and made mistakes, not many possibly, but a notable one was the cession in 1890 of the island of Heligoland to the German Empire in exchange for some, more or less, shadowy advantages in Africa. Originally of considerable size, the sea in 1784 tore the island asunder into what are known as the "Island" and the "Dune," and made other considerable inroads, but practically speaking Heligoland had no history of interest to the outer world until it was acquired by Germany in 1890. The intervening quarter of a century has been a period of ceaseless activity, and wonders have been achieved. Enormous sums of money have been spent to prevent further encroachments of the sea, and by means of well devised breakwaters the stretch of sea between the two islands has been converted into a large harbor, skilfully protected, which serves as a base for the submarines and light cruisers of the German Navy. The entire cliffs have been faced with a particularly durable form of granite, and in parts armor-plated wall, the masonry being yards in depth. All inequalities in the cliff face, caverns, etc., have been filled in with tremendously strong concrete.

In addition to forming a naval base the island is equipped with hangars and appliances for the storage of Zeppelins and other air craft, the cliffs are surmounted with the most modern disappearing forts, armed with Krupp guns with a range of some 20 miles, while the whole rock, like Gibraltar, is pierced in every direction with galleries and underground works to admit of the handling of the concealed guns, which literally bristle from every point of the island. Ever since their acquisition of Heligoland the Germans have discouraged all visitors and manifold difficulties have always been placed in the way of the foreign visitor, for what are now obvious reasons. As illustrating the thoroughness of the preparations of the enemy for the present struggle, it is interesting to note that for a long time past a stretch of land on the banks of the Elbe some 40 miles from Heligoland, had been prepared and was in readiness to receive the civil population of the island in certain eventualities, and that the entire population of natives and civilian residents were removed from Heligoland to their prepared quarters on the Elbe 36 hours before the outbreak of war.—*United Service Gazette*, 30/12.

THE GERMAN NAVAL COMMAND.—It is officially announced in the German newspapers that the Grand Cross of the Order of the Red Eagle with oak leaves and swords has been conferred upon "Admiral von Pohl, hitherto Chief of the High Sea Battle Forces."

Although no official announcement was made, it has been understood that Admiral von Pohl was made commander of the high sea fleet about a year ago, in succession to Admiral von Ingenohl. The form of the present announcement is presumably intended to indicate that Admiral von Pohl also has been removed from this post.—*London Times*, 5/2.

THE GERMAN COMMANDER-IN-CHIEF.—The death of Admiral Hugo von Pohl in Berlin explains the change which was made in the command of the German high sea fleet, of which he had been commander-in-chief for less than a year. He went afloat in succession to Ad-

miral von Ingenohl, who had assumed the command in January, 1913, and continued to hold it after war broke out. The selection of von Pohl to succeed him may have been made in order that this officer might superintend the carrying into effect afloat of the submarine "blockade," for which as Chief of the Admiralty Staff he had been largely responsible. He it was who signed the German declaration of the waters around the British Isles as a "war zone." There is no definite information at present as to the identity of his successor. An Amsterdam report last Saturday stated that Vice Admiral Scheer had issued in the name of the fleet a message of deep regret at the death of Admiral von Pohl, but whether he is the new commander-in-chief, or only second-in-command, is not clear. It has been suggested that Prince Henry of Prussia, who earlier in the war was reported to be in command in the Baltic, has taken charge of the entire high sea fleet. This is a very possible thing, for apart from his exalted situation as the Kaiser's brother and his experience as commander-in-chief from September, 1906, to September, 1909, he has a high professional reputation, and although he has been so long an admiral he is still comparatively young, being only 53 years old. He is, therefore, junior in age to Sir John Jellicoe, who is 56, and to Admiral d'Artige du Fournet, the French Admiralissimo, who is 59, but not to the youthful Italian commander-in-chief, Admiral the Duke of the Abruzzi, who is 43. Another rumor is that Admiral von Holtzendorff has left the post of Chief of the Admiralty Staff to go afloat in his former position in command of the high sea fleet.—*Army and Navy Gazette*, 4/3.

GREAT BRITAIN

VESSELS BUILDING

Name	Displacement	Speed	Armament	Builders	Remarks
Battleships					
1 Ship.....	27,500	25	8 15-inch	.....	To be completed in 1917
Renown.....	25,750	22	same	.....	" " "
Repulse.....	25,750	22	same	.....	" " "
Resistance.....	25,750	22	same	.....	" " "
Revenge.....	25,750	22	same	Vickers	" " 1916
Resolution.....	25,750	22	same	Palmer	" " "
Ramillies.....	25,750	22	same	Beardmore	" " "

VESSELS BUILDING IN JULY, 1914, AND NOW COMPLETED

Battleships					
2 Rev'nge class	25,750	22	8 15-inch	.....	Completed 1015
5 Queen Elizabeth class.	27,500	25	same	.....	" 3 in '15; 2 in '14
1 Battle Cr'ser					
Tiger.....	30,000	30	8 13.5-inch	.....	" in 1914
Light Cruisers					
8 Cl'p'tra class	4,400	30	....	.....	" " 1914-15
6 Arethusa class.	3,600	30	....	.....	" " "
3 Birmingham class.	5,440	25.5	....	.....	" " 1914

NOTE.—Approximately 31 destroyers and 21 submarines were building in July, 1914.

Since the war no official information regarding naval matters has been available, but it has been reported that the number of vessels building has been increased to the full capacity of the ship yards and that new vessels have been laid down as fast as those building have been completed. Also it has been reported that five large battle cruisers of 32 knots speed are nearing completion and that a number of monitors carrying 14 inch guns are either built or building.

MEN FOR THE NAVY.—When war started there were about 120,000 officers and men in the regular navy. Reserves and recruits enrolled since then have increased the navy proper to about 340,000. If the men at work in dockyards and naval establishments are added to this we have a total of about 1,000,000 men in the naval service.

In fulfilment of a promise made to him in the House of Commons on January 28, Dr. Macnamara has sent to Sir Gilbert Parker the following details of the numbers employed directly or indirectly on the navy:

"As regards the navy proper, we are now authorized to work up to a maximum of 350,000 officers, men, and boys by March 31, 1916, if necessary. Of that number we already bear something like 320,000.

"The question of the men engaged in ship construction, repairing, and in auxiliary work, upon which the maintenance and fighting efficiency of the fleet depend, is very much more difficult to arrive at. In the first place, we have somewhere about 85,000 men engaged in the Royal Dockyards and other naval establishments. As regards the number of men engaged on admiralty work under contract and subcontract, I am afraid it is quite impossible for me, in the time at my disposal, to give even the most speculative estimate, except to say that the number is certainly several times that of the figure which represents our own employees in the Royal Dockyards and other naval establishments . . . . If I were asked to put the matter in a sentence I should say that for every man in the navy, of whom there are, as you see, something like 300,000, there are certainly two persons, and possibly even three, at work on ship construction and repairing and contributing to the general maintenance and fighting efficiency of the fleet."—*London Times*, 21/2.

VALUE OF TRAINED NAVAL RESERVE.—The great value of a properly trained and efficient naval reserve has been shown in the present war as never before, in not only the British Navy, but the German Navy also.

The new issue of the *Navy List* bears eloquent testimony to the part which the auxiliary services are playing in the general work of the fleet. In the month of August last the losses among the rank and file totalled 446 killed; and of these only 141 were active service men of the Royal Navy. In September the number was 14 in a total of 188; in October, five out of 110; and in November and December, five out of 73. Of the 10 active service naval ratings shown as killed from the beginning of October to the 18th of December, four were petty officer mechanics of the R. N. Air Service. A good proportion of the total losses, which are, happily, extraordinarily light in comparison with those for the corresponding period of 1914, has fallen upon the R. N. R. and the specially-entered mercantile ratings taken over with their ships for naval service, while practically the whole of the remainder have to be set down to the operations in Gallipoli.—*Naval and Military Record*, 2/2.

SAFEGUARDING NAVAL MANNING NEEDS.—An interesting amendment to the military service bill was moved in the House of Commons last week by Mr. George Lambert, formerly Civil Lord of the Admiralty, and agreed to. It provided that the Admiralty should have the first call on the men who were brought in. In a word, therefore, recruiting for the navy is amply safeguarded, and it is a very satisfactory sign of the importance with which the sea forces of the Empire are regarded that the military efforts we are now making have not been allowed to prejudice the supply of seamen. We could wish that there was a similar assurance that, just as the government give first place to the manning of the fleet, they should accord similar treatment to the views, experience, and advice of those officers who have made the navy what it is, or who are called upon to use it.—*Army and Navy Gazette*, 1/29.

THE NEED FOR EXPERTS.—The new naval peer, Lord Charles Beresford, in the last speech he delivered as a commoner, spoke some home truths. He pointed out that we had been governed hitherto by 22 men, and he added, "only one out of the whole lot had the shade of an idea what conducting

a war meant." They were, the late member for Portsmouth added, "mostly amateurs and, what was worse, mostly lawyers." There will be a large body of agreement with the declaration that the duty of the government is to formulate its policy and "entrust the carrying of it out to an expert body of the three best soldiers and the three best sailors they could find." Weakness in the war administration unquestionably arises from the subordination of the expert. Seamen, in particular, have little or no influence on the policy of a maritime country, with consequences which are becoming increasingly apparent. There was never a time in our history when it was more necessary that naval opinion should have full weight, and there was never a time of war, probably, when naval opinion counted for so little. We trust that Lord Charles Beresford will develop his ideas in the freer atmosphere of the House of Lords. We look forward to a declaration by him of defence policy, free from consideration of parties or persons. In the Upper Chamber will be assured of a sympathetic hearing. As the history of the war has already shown, the country looks to the House of Lords for guidance, and Lord Charles Beresford could signalize his elevation in no fitter manner than by pointing out in a carefully prepared speech, without exaggeration and rhetoric, the defects in our administration from which we are suffering. The politician has had his chance as the director of war, and it is surely time that the expert was called in and given authority in those matters which he knows best.—*Naval and Military Record*, 19/1.

ADMIRALTY'S DEMAND FOR SHIPS.—Mr. Macnamara, replying to a question by Mr. Hogge, on the 27th inst., furnished the following details of the ships requisitioned by his department:

Owner	Vessels in Fleet	Vessels on Admiralty Service	Percentage of (2) on (1) Per cent
Evan Thomas Radcliffe & Company, Cardiff	25	12	48
Tatem & Company, Cardiff	14	6	43
Maclay & McIntyre, Glasgow	29	16	55
Prince Line, Newcastle and London	39	8	21
Constantine & Pickering, Middlesbrough	17	10	59
Glover Brothers, London	*13	3	23
Farrar, Groves & Company, London	9	4	44
Ropner & Company, West Hartlepool	*43	16	37
W. and C. T. Jones, Cardiff	*13	6	46
W. Runciman & Company, Limited, Newcastle and London	*30	14	47
Sutherland Steamship Company, Newcastle	†11	4	36

* Excluding one vessel interned. † Excluding two vessels interned.
—*United Service Gazette*, 3/2.

SHIPBUILDING RESOURCES BEING USED TO THE UTMOST.—The First Lord of the Admiralty has declared that "successive Boards of Admiralty have most anxiously considered the mode in which the building resources of the country can best be employed," adding that "these resources are now being used to their utmost." Evidently Mr. Balfour intended to be even more specific on this matter, for he continued to state that, "speaking broadly, it may be asserted that every dockyard, public or private, here or in the Mediterranean, is being used to its utmost capacity either for new construction or for repairs required by ourselves or by our Allies." He finally asserted that it was "impossible to add to the magnitude of our preparations." He admitted, on the other hand, that their character could be altered, but concluded by stating that "nothing has as yet occurred which would justify the Admiralty in thinking that any serious error of judgment had so far been made in connection with the various vessels which are under construction." The First Lord's statement leaves room for speculation.

The resources of this country for building and arming men-of-war are immense. They were illustrated in 1909, when eight battleships of the largest size, six protected cruisers, 20 destroyers, a number of submarines, and some auxiliary ships were put in hand. That program did not exhaust the capacity of the country. We had in hand a number of vessels building for foreign powers, including the *Sao Paulo* at Barrow, the *Rio de Janeiro* at Elswick, besides two scout cruisers, ten destroyers, and three submarines, all to the order of Brazil. Work was also in hand for Chile, China, and Portugal. We trust that the Admiralty has an adequate conception of the work which can be done by the public and private establishments under the pressure of war. The resources to-day are infinitely greater than they were in 1909, and the nation will confidently anticipate that the Admiralty will take the fullest possible advantage of them.—*Naval and Military Record, 2/2.*

EXTRACTS FROM MR. BALFOUR'S SPEECH IN THE HOUSE OF COMMONS.—Mr. Balfour, First Lord of the Admiralty, in his speech stated that the tonnage of the British Navy had been increased by 1,000,000 since the outbreak of the war, while the strength of the air division of the navy has grown tenfold.

INCREASE 1,000,000 TONS

Mr. Balfour told the house that never before in Great Britain's history had there been so much naval construction as in the last nineteen months. He asserted the fleet was far stronger than at the outbreak of the war, except in regard to armored cruisers. Many of the cruisers which had been lost has not been replaced.

Mr. Balfour emphasized the magnitude of the task Great Britain had taken upon herself, since the operations in the Mediterranean began in transporting, feeding and supplying the forces there. Moreover, the appearance of German submarines not only in home waters but in the Mediterranean had added to the responsibilities already undertaken.

He said about 1,000,000 combatants, 1,000,000 horses, 2,500,000 tons of stores and 27,000,000 gallons of oil for the British and their allies had been transported. This task, in the presence of hostile submarines, had thrown an enormous amount of work upon the Admiralty which could not have been foreseen at the outbreak of the war. The dangers experienced were new dangers, and he felt the nation could look with satisfaction at the manner in which the Admiralty had carried out its vast work.

The navy had expanded enormously since the outbreak of the war, Mr. Balfour said. A fair measure of its growth was the fact that its personnel had more than doubled within that period and its tonnage, including auxiliary cruisers and ships under the white ensign had increased by 1,000,000.

Warm praise was given by the speaker to Colonel Churchill in connection with the establishment of the naval air service. The growth of this branch of the service, he asserted, was even more remarkable than the increase in ships, the aerial service having expanded tenfold during the war.

Mr. Balfour said the admiralty had procured a large and especially suitable tract of land for the purpose of training aerial pilots for the navy. This work was to be under command of Commodore Payne, who had rendered invaluable service. He said the navy always must have an aerial service of its own.

Dealing with the relative values of heavier and lighter than air machines, Mr. Balfour said it was extremely desirable from a naval point of view to have lighter than air machines to supplement the efforts of the fleet in scouting. The greatest difficulty has been—he was speaking not of Zeppelins, but of non-rigid air ships—to erect suitable accommodations.

With regard to ship building, he said: "At no time in our history has there been so much shipbuilding for war purposes as during the last 19 months. The fleet is now far stronger than at the outbreak of the war, except with regard to armored cruisers. We lost some of these and did not replace them. But in armored cruisers our superiority is enormous,

and it is incontestable that the process of building warships has never been at greater speed. But we are still not satisfied. A real limit is imposed upon us by labor difficulties. In dreadnoughts, battleships, dreadnought cruisers, light cruisers, destroyers, submarines and patrol boats there has been a great augmentation, which has not suffered any check."

The same held good, the First Lord declared, with respect to guns, stores and munitions.

NAVY LEAGUE'S COMING-OF-AGE.—The Navy League this week celebrates its 21st birthday. No organization deserves more thoroughly the gratitude of the nation. A few energetic patriots, dissatisfied with the way in which naval matters were neglected by the public except when scares were started, founded a league to preach the importance of sea power. They looked forward to a time when England would have to fight for her very existence against a great Continental neighbor or combination of powers. How accurate was their prevision is shown when the coming-of-age festivities have to be celebrated in the midst of a world-war in which Germany has consecrated all her energies to bringing Britain to the dust. Fortunate in attracting influential support from naval men, the league has had as its presidents Admiral-of-the-Fleet Sir G. Phipps Hornby, the Earl of Drogheda, and Mr. Robert Yerburgh. Men of all shades of politics became members, one of the first being Mr. George Meredith. Branches of the league were opened in the provinces and in the dominions, Bristol being the first provincial center to have a branch, and Cape Town had the first Imperial offshoot. The league now has a membership of 150,000, and has established training homes for boys in various parts of the country. Trafalgar-day was made the pivot of its celebrations, but all hostility to our great ally was carefully avoided from the outset. The war has confirmed its teaching that only by maintaining an ample margin of ships can we sustain such losses as the *King Edward VII* without uneasiness.—*Naval and Military Record*, 12/1.

AUSTRALIA TO BUILD SUBMARINES.—Australia is to undertake, as soon as possible, the building of submarines in its own shipyards.—*London Times*, 31/1.

MERCHANTMEN REQUIRED TO CARRY SIGNALLING APPARATUS.—The British Board of Trade has issued instructions that on and after March 1, 1916, every British ship of 500 tons gross or upwards going to sea from a port in the United Kingdom will be required to be provided with suitable hand flags for signalling by the semaphore code and with an efficient Morse flashing lamp. In the case of a ship which is fitted with a fixed semaphore the provision of hand flags will not be required.—*Shipping Illustrated*, 26/2.

ADMIRALTY SYSTEM OF INDEXING SHIPS.—The first detailed description of the system on which the Admiralty Transport Department works in fulfilling its requirements from the mercantile marine is given by Mr. T. Paterson Purdie, president of the Clyde Steamship Owners' Association and member of the Ship Licensing Committee. Mr. Purdie describes the system as follows:

A card index is maintained with a card for every ship in the mercantile marine. These cards are distinguished into 28 classes by colors and "tabs"; and movable colored signals which are changed day by day, follow the movements of the ships and show at a glance in what area of the world each ship is at any moment. This card index enables the transport department, when new requirements have to be met, to obtain at short notice a complete list of all the possible suitable vessels.

Full information is registered and brought up to date by monthly returns from each owner, and also by reports each day as actual charters are made, showing on what employment their vessels are engaged; so that the transport department has full information in a readily accessible form of just what each of the 6000 or so possible vessels are doing.

An elaborate system is also maintained to show at a glance what previous service under requisition each owner has done in the period during which

market rates have risen considerably above requisition rates. This system takes into account the number of ships in the owner's fleet, the time each of them has been engaged, the size of the ships, and also the number on service at the moment.

COMPARISON OF OWNERS' SERVICES

Before new requirements are met, a special list is made out from the above records showing all the possible vessels which are of the right type and in the right position for the services in question. On such a list is shown (*a*) the service on which the vessel is engaged; (*b*) what cargo she would be carrying if left free from requisition; (*c*) her size, type, etc.; (*d*) her exact position; and lastly (*e*) a figure showing just how the owner's previous service compares with other owner's service. This list is then examined with great care, so that the transport department may choose—first of all—the ships that are most suitable for the service and the proper position; secondly, those whose requisitioning involves the least possible disturbance of other important service and least dislocation of industry; and thirdly, so far as these primary considerations allow, those which belong to owners who have done less than the average amount of previous service for the government.

A vessel is never requisitioned except on the expert advice that she is entirely suitable for the service or the most suitable of those available, and after the most careful consideration of the effect the requisition will have upon the industry of the country and its ordinary overseas trades.

Around the walls of the statistical department are full lists with the ships' names and positions corrected and kept up to date as telegrams come in daily and nightly advising the movements of each ship.

"In short," Mr. Purdie continues, "I consider that the system is such as to give fair play to each and every owner, however upset and disappointed one may feel when his boat (or boats) are requisitioned and brought under 'Blue-book' rates to meet the country's insistent and emergent demands, instead of being free to trade on established lines as usual, or carry out an ordinary charter on time or voyage entered into in the open market . . . .

"Vessels that are requisitioned for civil work such as the carriage of food stuffs, wheat, grain, sugar, etc., or for nitrates and materials for the munitions departments are operated on commercial lines, as the transport department has appointed as agents shipping firms of the highest standing, and full local knowledge and experience, at all the principal ports at home and abroad, who attend to the loading, discharging, and other work incidental to ship management with the view of operating each ship on strictly business lines to ensure its most economical use.

"To control 1800 ships of all types and classes is a stupendous undertaking. even when that control is paramount throughout every operation of the ships; but when this gigantic fleet is split up and passes in groups and sections from the transport department to local commanders in charge of naval and military affairs—whose special requirements dominate their working—then one realizes how very unfair and uncalled for all the acrid criticism of the Admiralty Transport Department is, and the misconception of the actual state of affairs by the critics."—*London Times, 22/2.*

HOLLAND

VESSELS BUILDING

Name	Displacement	Speed	Armament	Builders	Remarks
Cruisers					
.....	7000	30	10 6-in.	Amsterdam	Authorized
.....	7000	30	10 6-in.	Flushing	Authorized

NOTE.—Four submarines are building, three at Rotterdam and one at Flushing, of 836 tons displacement and a surface speed of 17½ knots.

ITALY

VESSELS BUILDING

Name	Displacement	Speed	Armament	Builders	Remarks
Battleships					
Carraciolo.....	30,000	25	8 15-in., 16 6-in.	....	To be completed in 1917
Marcantonio-Colonna.	30,000	25	same	....	" " "
Cristofaro-Colombo.	30,000	25	same	....	" " "
Francesco-Marosini.	30,000	25	same	....	" " "
VESSELS BUILDING IN JULY, 1914, AND NOW COMPLETED					
Battleships					
Conte-di-Cavour.	22,022	22.5	13 12-inch	....	Completed in 1914
2 Duilio class....	22,564	22.5	13 12-inch	....	" " 1915
Light Cruisers					
2 Campania class	2,500	16.5	6 6-inch	....	" " "

NOTE—In July, 1914, approximately 15 destroyers, 2 torpedo boats, and 8 submarines were building.

It is probable that the building program has been accelerated and increased since the outbreak of the war.

JAPAN

VESSELS BUILDING

Name	Displacement	Speed	Armament	Builders	Remarks
Battleships					
Yamashiro	31,300	22.5	....	Kawasaki	To be completed in 1916
Ise	31,300	22.5	....	Mitsubishi	" " " "
Hinga	31,300	22.5	....	Yokosuka	" " " 1917
VESSELS BUILDING IN JULY, 1914, AND NOW COMPLETED					
1 Battleship					
Fuso.....	30,600	22	12 14-inch	.....	Completed in 1915
2 Battle Cr's'rs					
Haruna class..	27,500	28	8 14-inch	.....	" " 1914-15

NOTE.—In July, 1914, Japan had 2 destroyers and 2 submarines under construction in England and France respectively.

Captain Josiah S. McKean, U. S. Navy, aid for material, told the House Naval Affairs Committee last week that Japan was believed to have adopted a program of four battle cruisers, four dreadnoughts, 64 destroyers, 53 submarines and a number of scouts and auxiliaries. He stated that our navy was only one-half as strong as the combined navies of Germany and Austria, while the French Navy he held to be 20 per cent more efficient than ours.—*Army and Navy Journal*, 26/2.

KATO WARNS JAPAN OF NAVY'S DEFECTS.—Admiral Tomosaburo Kato, the Japanese Naval Minister, discusses in the January issue of the *Japan Magazine* of Tokio the naval expansion of Japan. In this article the Japanese

minister asserts that a decade ago the Japanese Navy was ready to meet any power that might have appeared in eastern waters, but adds that owing to what he calls "straightened circumstances" the Japanese Navy does not enjoy the standing it once had. Japan's only desire in a naval way, he adds, is a navy adequate to defend the empire.

"Japan's navy has not at all expanded proportionately to her wealth; and no nation should permit its defences to fall below the position to which destiny brings it.

"It is to fill up this fatal defect in the defences of our great empire that the naval authorities ask for repletion. For this Japan must have at least 12 battleships of the *Fuso* class; and even then her fleet will still be inferior to some others. Left as it is now, the Japanese Navy will be worthless in case of war. Should emergency arise the nation has no right to expect the present navy to meet and defeat any enemy of importance. Ships are as necessary as personnel to insure victory.

JAPAN'S NAVAL PLAN

"If the plan now under contemplation is completed Japan will have but four ships of the *Fuso* (31,500 tons) type and four new battle-cruisers of the *Kongo* class (27,000 tons), while Germany will have 41 battleships and 20 battle cruisers; and the American Navy is expanding at a corresponding rate. Russia, too, is building up a great navy of three squadrons of 12 units each, compared with which the navy of Japan will be quite insignificant. Consequently, Japan can never afford to be satisfied with her present naval plans if she expects to maintain the position she has won. She will then be obliged to take her place beside China, Greece, and Spain. Japan must replace her present obsolete units by units of modern efficiency. Our plans are not sufficiently ambitious, but we cannot go beyond our finances. We are attempting the maximum that our funds will allow. This makes the defects in our defences all the more serious, especially at a time when world-war is raging and one cannot tell what a day may bring forth. Should unforeseen emergency arise our first action would inevitably be at sea, and the navy would have to face the responsibility. For a nation like Japan the efficiency of naval defence is paramount.

"The safety of the empire cannot be left to the fluctuations of the Treasury. Every day the plan of naval repletion is delayed means one day more of danger to the empire. When the time comes that a nation is unable to meet the outlay necessary to adequate naval defence that nation is bankrupt. To abandon the navy is tantamount to abandoning the state."—*N. Y. Times*, 27/2.

PORTUGAL

EFFECTIVE VESSELS IN PORTUGAL'S NAVY

Name	Displacement	Speed	Armament	Complement	Remarks
Battleships					
Vasco Da Gama	3,000	15	2 8-inch, 4 4.7-inch	220	Completed in 1877; refitted in 1903.
Cruisers					
Republica.....	1,640	17.5	4 5.9-in., 2 3.9-in.	273	Completed in 1901.
Sao Gabriel....	1,772	17	2 5.9-in., 4 4.7-in.	242	Completed in 1899.
Alnurarite Reis	4,100	22	4 5.9-in., 8 4.7-in.	473	Completed in 1899.
Adamaster....	1,962	18	2 5.9-in., 4 4.7-in.	232	Completed in 1897.

NOTE.—In addition to the above Portugal has 5 gunboats, 6 destroyers, 3 torpedo boats, and 1 submarine. (2 gunboats, 2 destroyers, and 3 submarines are in process of construction.)

Two destroyers under construction at the Naval Arsenal, Lisbon, will be launched within a short time. Keels will be laid at once for two more destroyers, the first of a new series of larger tonnage planned for the Portuguese Navy. The new boats will have liquid combustion, four torpedo tubes, a speed of 35 to 38 miles, and will be armed with 3.9-inch guns. Three submarines of wide radius action will be constructed at the arsenal on the ways now occupied by two gunboats being built for patrol purposes.—*Shipping Illustrated*, 19/2.

RUSSIA

VESSELS BUILDING

Name	Displacement	Speed	Armament	Builders	Remarks
Battleships					
Emperor Alexander III	22,435	21	12 12-in., 20 4.7-in.	Nikolaieff	Commissioned 1915
Empress Marie	22,435	21	same	Ivan Bunge Cc.	" 1914
Catherine II...	22,435	21	same	" " "	" 1915
Battle Cruisers					
Ismail.....	32,200	25	12 14-in., 21 5.1-in.	Galerni	To be completed in 1916
Kinburn.....	32,200	25	same	Baltic Works	" " "
Borodino.....	32,200	25	same	Galerni	" " "
Navarin.....	32,200	25	same	Baltic Works	" " "

VESSELS BUILDING IN JULY, 1914, AND NOW COMPLETED

Battleships					
4 Sevastopol class.	23,026	23	12 12-inch	....	Completed in 1914
Light Cruisers					
6 Adm'l Greig class.	7,500	32	....	....	" " 1914-15
2 Ad. Nevelskoi class.	4,500	..	....	....	" " "

NOTE.—Approximately 44 destroyers and 19 submarines were building in July, 1914. Official information regarding naval matters being unobtainable since the outbreak of war, it may be assumed that the ship yards have been kept busy to their utmost capacity and new vessels have been laid as fast as those building have been completed.

SPAIN

VESSELS BUILDING

Name	Displacement	Speed	Armament	Builders	Remarks
Battleships					
Alfonso XIII..	15,450	19.5	8 12-in., 20 4-in.	Ferrol	Launched May 7, 1913
Jaime I.....	15,450	19.5	same	"	Laid down Feb. 5, 1912

NOTE.—Spain's building program includes the following: 4 fast cruisers, 6 destroyers, 28 submarines, 3 gunboats, and 18 coast-guard mine layers.

The shipbuilding yards of Nervion, Spain, are being enlarged to permit of the construction of vessels of 1500 to 5000 tons. The Peruvian Government is considering the construction of a cruiser of 2850 tons displacement, by the Sociedad Espanola at Ferrol, to displace 2850 tons, at a cost of 1,260,000 pesos. It is not improbable that orders for other vessels will be placed at Peru. The new shipbuilding yards of the Sociedad Espanola de Construcciones Navales, of Bilbao, are shortly to begin on the building of vessels for the Compania Transatlantica, of Barcelona.—*Shipping Illustrated*, 3/4.

UNITED STATES

UNITED STATES BATTLESHIP "NEVADA."—The battleship *Nevada*, with her sister ship the *Oklahoma*, was authorized by an act of Congress, approved on March 4, 1911. The contract for the construction of the *Nevada* was placed with the Fore River Shipbuilding Corporation, Quincy, Mass., on January 22, 1912, the price being $5,879,000 (£1,205,000), exclusive of armor and armament, and the time of construction 36 months.

The *Nevada* is a twin screw vessel fitted with Curtis turbines, designed for a speed of 20½ knots at 27,500 tons trial displacement with the engines developing 26,500 shaft horse-power. A supplementary contract was made with the builders on June 31, 1914, increasing the contract price $50,000 (£10,250) and the time of construction 5 months, in order to cover the installation of a geared cruising turbine on each shaft, and at the same time changes were made by the builders in the design of the main turbines, reducing the numbers of rows of blades, increasing the blade clearances and changing the method of securing the blades.

The principal dimensions of the *Nevada* are as follows:

Length over all	583 feet
Length between perpendiculars	575 feet
Beam, molded	94 feet 10⅛ inches
Depth, molded at side to main deck	44 feet 5½ inches
Load draft	28 feet 6 inches
Mean trial displacement	27,500 tons.
Tons per inch immersion at load water-line	93.2 tons
Area of midship section	2665 square feet
Area of load water-line plane	39,160 square feet
Area wetted surface	65,700 square feet
Coefficient of fineness	0.6168

The vessel has a single smokestack and two cage masts.

The main armament consists of ten 14-inch guns, arranged in four turrets on the center-line of the ship. The two forward turrets are located on the main deck. The extreme forward and after turrets have three guns each and the other turrets two guns each. The turrets are electrically operated through variable speed gear.

The secondary battery consists of twenty-one 5-inch guns, located, seven on the second deck, 12 on the main deck and two on the superstructure deck. There are also four air defence guns; four 3-pounder guns for saluting; two 1-pounder guns for boats; two 3-inch field pieces, and two 30-caliber machine guns.

The captain's quarters are on the upper deck abaft the second turret, while the officers' quarters are forward on the main and second decks. Amidships on the second deck are the principal executive offices. The galleys for the officers and crew are on the main deck. In the space around the uptake on the third deck are a foundry and coppersmith and blacksmith shops.

Propulsion is by Curtis turbines, arranged on two shafts in four water-tight compartments, supplied with steam at 295 pounds per square inch pressure from 12 Yarrow water-tube boilers arranged in three water-tight compartments.

As shown on the plan, Fig. 2, in each forward engine room there is a geared cruising turbine connected to the main shaft by means of a jaw clutch, and one 132-inch diameter high-pressure turbine. In each after engine room there is one 138-inch diameter low-pressure turbine and a reversing turbine in a single casing. The main turbines are designed to develop collectively, 26,500 shaft horse-power at about 222 revolutions per

NAVY DEPARTMENT

BUREAU OF CONSTRUCTION AND REPAIR

VESSELS UNDER CONSTRUCTION, UNITED STATES NAVY, MARCH 10, 1916

Name, type and no. of vessel	Contractor	Per cent of completion			
		Mar. 1, 1916		Feb. 1, 1916	
		Total	% on ship	Total	% on ship
Battleships					
36 Nevada	Fore River S. B. Co.	99.6	99.6	99.0	99.0
37 Oklahoma	New York S. B. Co.	99.5	99.5	99.2	99.2
38 Pennsylvania	Newport News S. B. Co.	97.9	97.9	96.5	96.5
39 Arizona	New York Navy Yard	83.8	82.6	81.5	80.0
40 California	New York Navy Yard	21.7	15.1	20.0	10.7
41 Mississippi	Newport News S. B. Co.	39.7	26.7	37.9	24.9
42 Idaho	New York S. B. Co.	54.4	50.7	53.0	48.0
43	New York Navy Yard	0.0	.....	.....	.....
44	Mare Island Navy Yard	0.0	.....	.....	.....
Destroyers					
57 Tucker	Fore River S. B. Corporation	92.5	92.4	89.8	89.7
59 Porter	Wm. Cramp & Sons	92.1	92.0	89.9	89.8
61 Jacob Jones	New York S. B. Co...Delv'd Feb. 10, 1916	.....	.....	99.9	99.9
62 Wainwright	New York S. B. Co.	95.6	95.6	95.3	95.3
63 Sampson	Fore River S. B. Corporation	79.1	77.6	75.3	73.4
64 Rowan	Fore River S. B. Corporation	74.3	70.8	70.7	66.0
65 Davis	Bath Iron Works	72.6	71.1	69.2	67.2
66 Allen	Bath Iron Works	70.6	68.8	67.7	65.5
67 Wilkes	Wm. Cramp & Sons	55.2	52.6	52.0	49.3
68 Shaw	Mare Island Navy Yard	21.8	18.4	18.9	13.3
69	Mare Island Navy Yard	0.0	.....	.....	.....
70	Norfolk Navy Yard	0.0	.....	.....	.....
71	Seattle Construction & D. D. Co.	0.0	.....	.....	.....
72	Wm. Cramp & Sons	0.0	.....	.....	.....
73	Wm. Cramp & Sons	0.0	.....	.....	.....
74	Bath Iron Works	0.0	.....	.....	.....
Submarines					
27 G-2[1]	Lake T. B. Co. (Bridgeport)	92.0	92.0	92.0	92.0
31 G-3[1]	Lake T. B. Co. (Bridgeport)	88.6	88.4	88.6	88.4
40 L-1	Electric Boat Co. (Quincy)	98.9	98.9	98.9	98.9
41 L-2	Electric Boat Co. (Quincy)	98.9	98.9	98.5	98.5
42 L-3	Electric Boat Co. (Quincy)	98.9	98.9	98.1	98.1
43 L-4	Electric Boat Co. (Quincy)	98.9	98.9	98.1	98.1
44 L-5	Lake T. B. Co. (Bridgeport)	85.5	82.2	85.5	80.0
45 L-6	Lake T. B. Co. (Long Beach, Cal.)	77.5	74.7	76.8	73.5
46 L-7	Lake T. B. Co. (Long Beach, Cal.)	76.7	73.9	74.8	71.5
47 M-1	Electric Boat Co. (Quincy)	94.9	94.9	94.6	94.5
48 L-8	Portsmouth, N. H., Navy Yard	76.0	75.4	72.4	72.0
49 L-9	Electric Boat Co. (Quincy)	92.2	91.6	91.3	90.5
50 L-10	Electric Boat Co. (Quincy)	91.5	90.6	90.6	89.5
51 L-11	Electric Boat Co. (Quincy)	82.2	86.2	87.7	85.5
52 Schley	Electric Boat Co. (Quincy)	1.0	0.0	0.0	0.0
53 N-1	Electric Boat Co. (Seattle)	51.8	43.5	48.4	41.2
54 N-2	Electric Boat Co. (Seattle)	51.8	43.5	48.4	41.2
55 N-3	Electric Boat Co. (Seattle)	51.8	43.5	48.4	41.2
56 N-4	Lake T. B. Co. (Bridgeport)	55.6	50.7	55.0	49.2
57 N-5	Lake T. B. Co. (Bridgeport)	55.0	50.2	53.2	48.1
58 N-6	Lake T. B. Co. (Bridgeport)	53.3	48.3	52.0	46.8
59 N-7	Lake T. B. Co. (Bridgeport)	54.3	49.4	53.1	47.9
62 O-1	Portsmouth N. H. Navy Yard	0.0	.....	.....	.....
63 O-2	Puget Sound Navy Yard	0.0	.....	.....	.....
64 O-3	Electric Boat Co. (Quincy)	0.0	.....	.....	.....
65 O-4	Electric Boat Co. (Quincy)	0.0	.....	.....	.....
66 O-5	Electric Boat Co. (Quincy)	0.0	.....	.....	.....
67 O-6	Electric Boat Co. (Quincy)	0.0	.....	.....	.....
68 O-7	Electric Boat Co. (Quincy)	0.0	.....	.....	.....
69 O-8	Electric Boat Co. (Quincy)	0.0	.....	.....	.....
70 O-9	Electric Boat Co. (Quincy)	0.0	.....	.....	.....
71 O-10	Electric Boat Co. (Quincy)	0.0	.....	.....	.....
72 O-11	Lake Tor. Boat Co. (Bridgeport)	3.6	3.2	1.8	.....
73 O-12	Lake Tor. Boat Co. (Bridgeport)	3.9	3.2	1.9	.....
74 O-13	Lake Tor. Boat Co. (Bridgeport)	3.7	3.2	1.9	.....
75 O-14	Cal. S. B. Co. (Long Beach, Cal.)	4.0	2.4	.....	.....
76 O-15	Cal. S. B. Co. (Long Beach, Cal.)	4.0	2.4	.....	.....
77 O-16	Cal. S. B. Co. (Long Beach, Cal.)	4.0	2.4	.....	.....
Fuel Ships					
14 Maumee	Mare Island Navy Yard	99.7	99.7	99.1	99.1
15 Cuyama	Mare Island Navy Yard	37.9	29.7	29.3	20.3
Miscellaneous					
Supply Ship No. 1	Boston Navy Yard	47.6	45.7	42.9	41.3
Henderson (Transport No. 1.)	Phila. Navy Yard	50.5	49.0	47.8	46.5

[1] Contracts forfeited, vessels being completed New York Yard.

minute. The cruising turbines are designed to develop 1750 shaft horsepower each at 3200 revolutions per minute and are geared down to the ratio of 23.85 to 1. The cruising units may be used at all speeds ahead below 15½ knots but are disconnected for higher speeds and when reversing.

Each high-pressure turbine consists of five wheel stages, a forward and an after drum. The first stage consists of four moving rows and the other wheel stages have two moving rows each. The five stage wheel is secured to the forward end of the forward drum, which has nine single row stages, while the after drum has 16 single row stages. The two drums are so designed as to practically balance the steam thrust in the high-pressure turbine at all speeds.

The low pressure turbines consist of a drum with 38 single row stages. The reversing turbines, incorporated in the same casings as the low-pressure turbines, consist of one stage with four moving rows of of blades, one stage with three moving rows of blades and a drum with eight single row stages. The second stage wheel is integral with the drum.

Steam is supplied to the high-pressure turbine through two 9-inch throttle valves and 9-inch pipes, one leading to each of the full-power steam chests. Steam to the cruising chest is supplied through a 5-inch throttle and a 5-inch pipe. For reversing steam is supplied through a 13-inch throttle and a 13-inch pipe to the after-engine room, where the pipe is divided into two 9-inch pipes, leading to the steam chests on the after end of the low-pressure turbines.

For going ahead with the main turbines only in use steam is supplied to the forward-engine rooms through either one or both of the 9-inch pipes or the 5-inch cruising connections to the ahead steam chests, thence through the first, second, third, fourth and fifth wheel stages and the forward drum; thence out through four 11-inch receiver pipes to the steam belt on the after end of the high-pressure turbine and forward through the after drum to the exhaust belt of the high-pressure turbine. From there it exhausts through two 20-inch pipes which combine into one 28-inch pipe and exhaust to the low-pressure turbines. In the after-engine room this pipe divides into two 20-inch pipes which lead to the steam belts on the ahead end of the low-pressure turbines. The steam then passes through the low-pressure turbines to the exhaust belt, thence through the exhaust trunk to the condenser.

When the cruising turbines are in use steam is supplied from the main steam pipe to the cruising turbines, thence to the first stage of the high-pressure turbines, thence through the second, third, fourth and fifth stages, as is the case when operating under the main turbines only. The exhaust from the cruising turbine leads to the first stage of the high-pressure turbine and therefore does no work in this stage. A cruising connection of the high-pressure steam chest is provided, however, so that speeds slightly in excess of those given by the steam that passes through the cruising turbine can be obtained.

The turbine wheels are built up of two steel plate disks riveted to a cast-steel spider. The wheel rims are of forged steel except for the first stage ahead and astern, which are cast steel. The drums consist of cast-steel spiders, forced on and keyed to the rotor shafts, with heads of steel plate and rims of forged steel. The diaphragms are of dished steel plate with cast-steel rims and hubs. Leakage of steam and air around the shaft where it passes through the casings, is prevented by steam-sealed carbon packing stuffing boxes.

The turbine blades and the distance pieces which separate them are of rolled brass, dovetailed into grooves in the periphery of the wheels and rims. The shrouding for the blades is also of rolled brass. In the high-pressure turbine the length of the blades ranges from 1.46 inches in the first row of the first stage to 1⅞ inches in the third row on the fifth stage, and from 1⅝ inches to 1⅞ inches on the forward drum, and from 2½ inches to 3⅞ inches on the after drum. In the low-pressure turbine the length of the blades ranges from 4⅝ inches in the first stage to 13½ inches in the

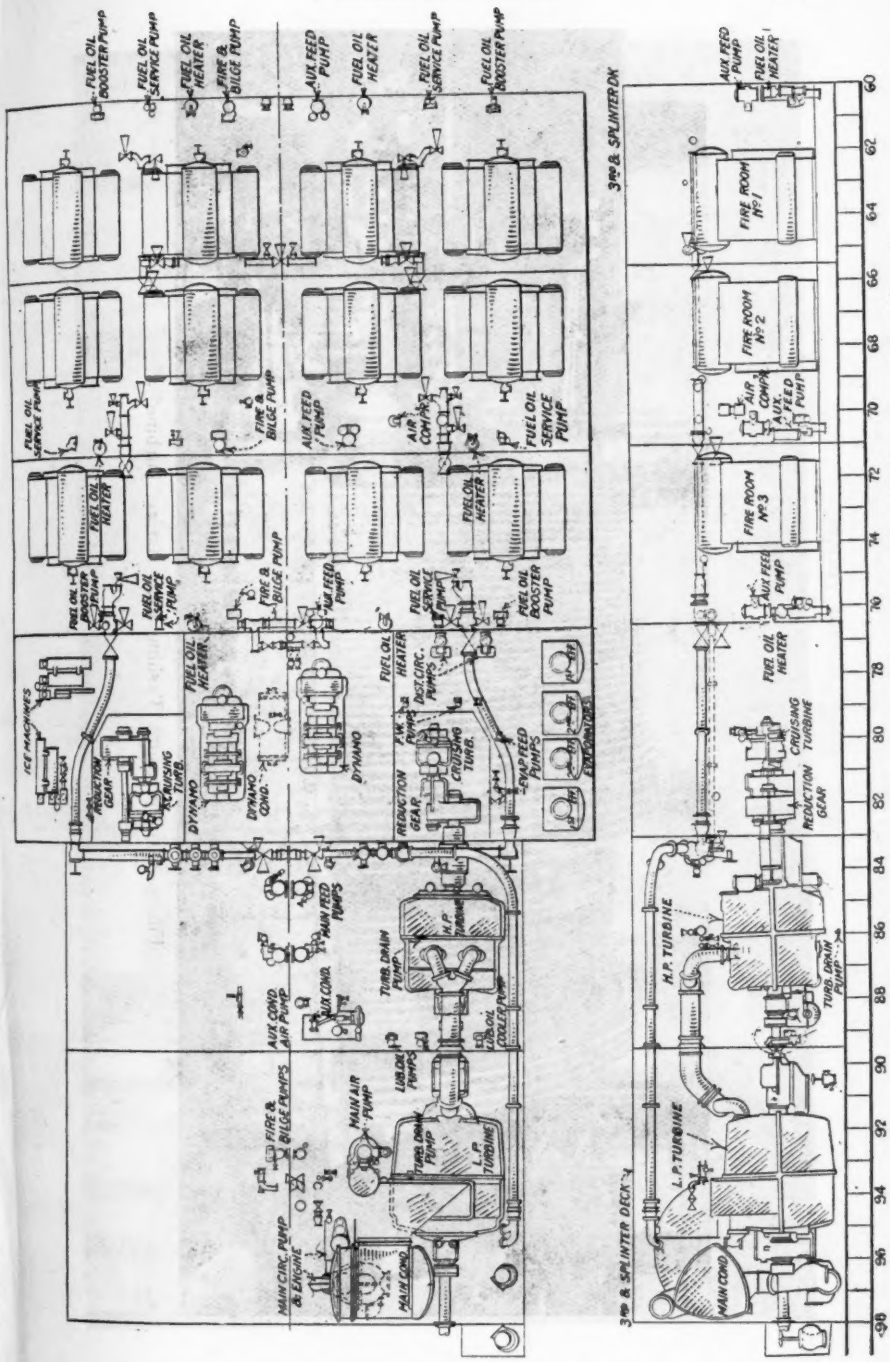


FIG. 2.—Diagram Showing Plan and Elevation of Boiler and Engine Rooms of the *Nevada*

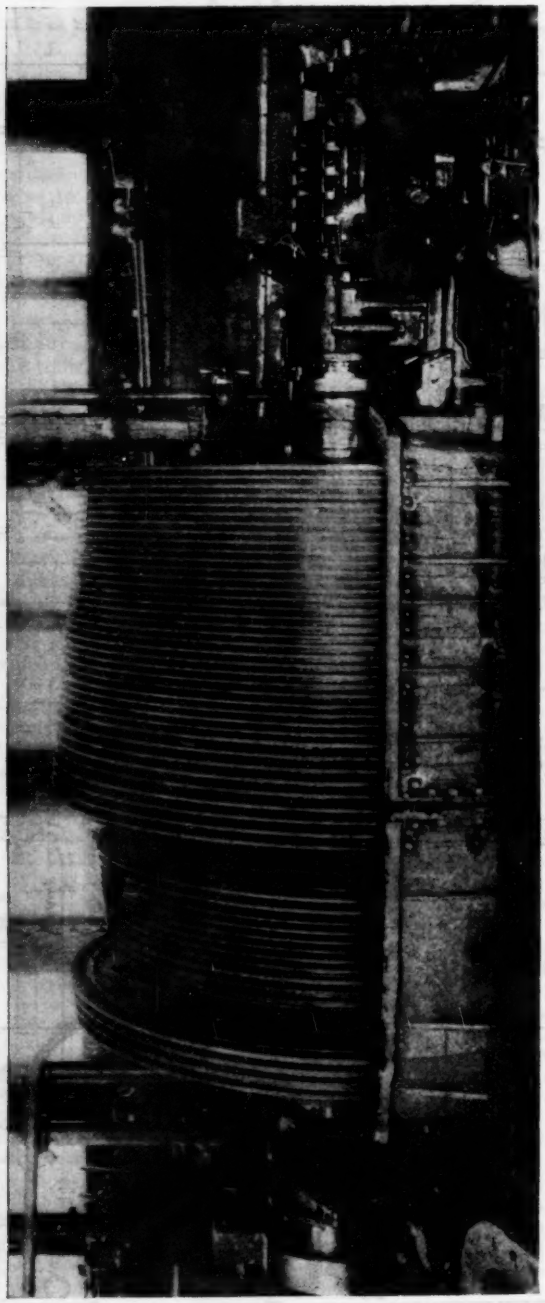


FIG. 3.—Low-pressure Turbine with Astern Turbine

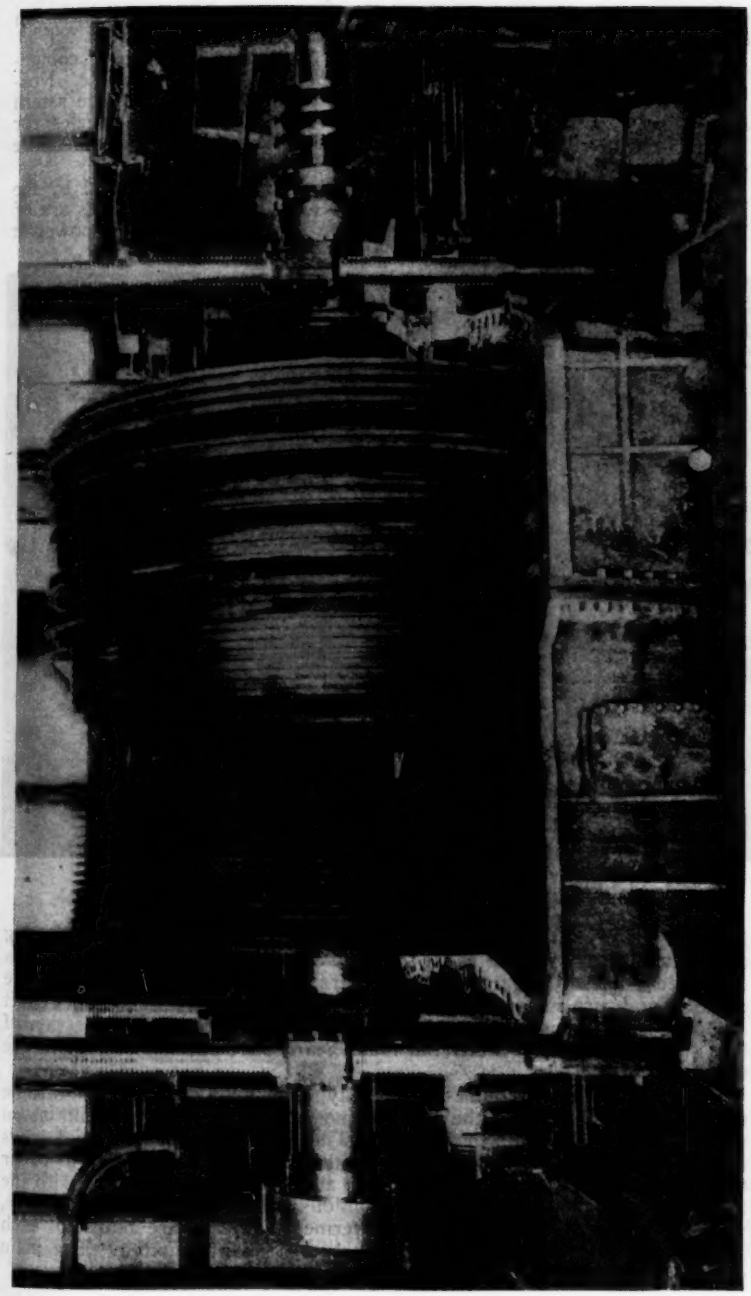


FIG. 4.—High-Pressure Turbine

last stages. In the reverse turbines the blades range from 1.76 inches in length in the first high-pressure stage to 8 inches in the last stage.

Nozzles for the first stage ahead and the first stage astern are of composition, the openings being accurately machined and filed to template. Nozzles for the second to the fifth stages ahead and the second stage astern are of composition with Monel metal division plates. The nozzles for the first stage ahead and first stage astern are expanding, while all others are parallel wall nozzles.

The cruising turbines and reduction gears were manufactured by the General Electric Company, Schenectady, New York. The turbines are of the three-stage Curtis type, designed to develop 1750 shaft horse-power at

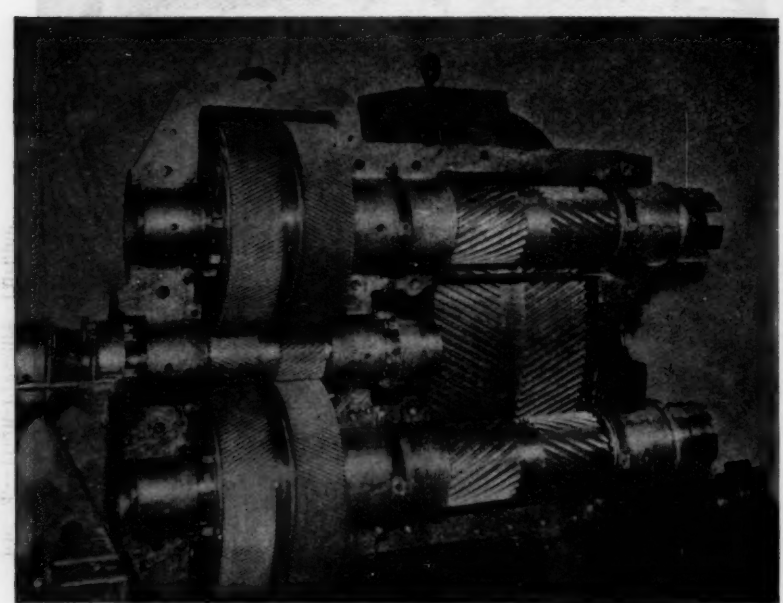


FIG. 5.—Reduction Gear for Cruising Turbine

3200 revolutions per minute, with steam at 250 pounds gage and exhausting against a back pressure of about 5 pounds gage. All stages in the turbines are wheel stages. The turbines and gears for each of the two shafts are identical and turn in the same direction, but in order to turn the port shaft outboard when going ahead the port unit is turned around and a section of line shafting placed between the main gear shaft and the high-pressure thrust shaft.

The gears are of the double-reduction type, the main pinion of the turbine shaft driving the gears on the two intermediate shafts, while the pinions on the latter drive the main gear wheel. The faces of all pinions and gears are divided into two parts with the teeth cut at opposite angles in order to balance the thrust. The teeth are cut at an angle of 27 degrees with the axis; both the main and intermediate pinions are forged solid on the sleeve, which fits around the shaft. The intermediate gears are built up, each section consisting of five steel disks securely bolted together. The main gear is of cast iron, with a forged-steel rim in which the teeth are cut.

The propellers are three-bladed of manganese bronze, cast solid with a diameter of 14 feet 3 inches, a pitch of 12 feet, a projected area of 71.5 square feet, a helicoidal area of 81.5 square feet, a disk area of 159.48 square feet, with a ratio of projected area to disk area of .4483 and of helicoidal area to disk area of .51.

As previously mentioned, steam is furnished at 295 pounds gage pressure by 12 Yarrow watertube boilers, arranged in three watertight compartments. Each boiler has a heating surface of 4000 square feet with a furnace volume of 625 cubic feet. Oil fuel is used exclusively in firing the boilers, seven Fore River burners being fitted to each boiler. Forced draft is provided by twelve Sturtevant multivane fans in each fireroom. Each fan has a rated

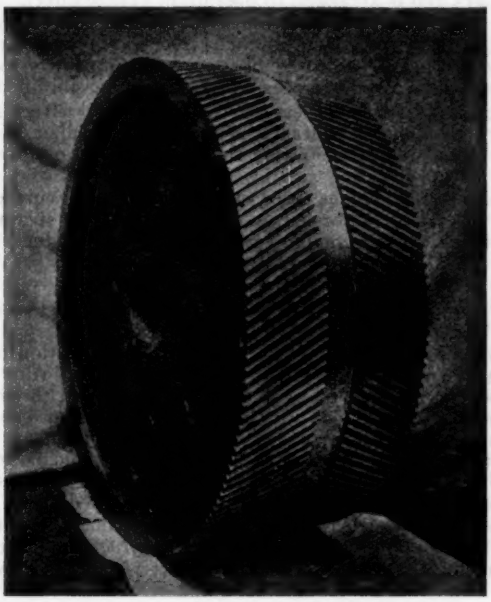


FIG. 6.—Main Gear Wheel

capacity of 16,000 cubic feet of air per minute when discharging against a back pressure equal to 5 inches of water and each fan is driven by a direct connected General Electric motor of 32 horse-power.

There is one main condenser in each after-engine room, having a cooling surface of 9900 square feet, provided with a Blake vertical twin plex single-acting air pump 18½ by 40 by 21 inches. The circulating pumps are of the centrifugal type, with a capacity of about 22,500 gallons per minute, driven by vertical compound reciprocating engines.

Auxiliary condensers of 405 square feet cooling surface each are provided in each forward-engine room with Blake vertical double-acting air pumps, 6 x 10 x 8 inches, and centrifugal circulating pumps driven by a single vertical reciprocating engine. In each forward room there is also a Reilly vertical multicoil feed water heater of 319.8 square feet heating surface for use with the main feed pumps. The main feed pumps are of the Blake vertical double-acting type, while in the after-engine rooms are Blake vertical double-acting single fire and bilge pumps.

The electric plant consists of four 300-kilowatt General Electric generators connected to 2-stage horizontal Curtis turbines. Two of the generators are located in a forward dynamo room and the other two in an after dynamo room. The condensing apparatus for each dynamo room is located directly under the dynamo rooms and a separate distribution room is located directly overhead each dynamo room. Each generator is capable of delivering one-third overload for two hours withut injury.

The evaporating and distilling apparatus consists of four Reilly horizontal multicoil evaporators, two Reilly vertical multicoil distillers, two Reilly U-type Bureau standard feed water heaters, two distiller circulating pumps, two evaporator feed pumps and two fresh water pumps together with the necessary accessories. The plant has a rated capacity of 25,000 gallons of water in 24 hours and is arranged to operate in double effect.

Ventilation throughout the ship is provided by 48 Sturtevant ventilating fans driven by General Electric motors. Air is supplied on the plenum system and heater boxes are fitted in the ventilating ducts to all quarters below the upper deck, crew's spaces, etc., for heating the incoming air.

The refrigerating plant consists of two horizontal steam-driven Allen condensed air machines, manufactured by H. B. Roelker of New York. Each machine is capable of producing the cooling effect of three tons of ice per day.

The deck machinery includes three motor-driven deck winches, electrical-driven anchor gear and motor-driven capstan, and both steam and electric steering gear, all of which is supplied by the American Engineering Company of Philadelphia.—*Marine Engineering*, March, 1916.

"PENNSYLVANIA" TRIALS.—The new U. S. battleship *Pennsylvania* finished her builders' trials off the Maine course this week and returned to Newport News, Va. The fastest mile of her standardization test February 27 was made at the rate of 21.75 knots. For five high speed runs the *Pennsylvania* developed an average of 21.38 knots an hour and three of the runs were made at 13 and 21 knots. In her record spurt her propellers made 216.4 revolutions a minute. In making her contract speed of 21 knots 210 revolutions a minute were necessary. There were 500 picked men on board furnished by her builders, together with 60 government officials. The Navy Board of Inspection, it is understood, were much pleased at the performance of the ship during her trials, some of which were made in rough weather. She proved a fine sea boat, it is said. The *Pennsylvania* will be turned over to the government, it is expected, the latter part of April.—*Army and Navy Journal*, 4/3.

OKLAHOMA TRIALS.—After completing her successful trial trip, the super-dreadnought *Oklahoma* steamed up the Delaware to the New York Shipbuilding yards, Camden, January 30.

During her trials off the coast of Maine the ship averaged 20.58 knots on the 24 hour run, while her contract called for 20.05. She covered 2250 miles on the trip and her consumption of fuel oil was considerably below the estimate. She will be formally turned over to the government in a few weeks.—*Nautical Gazette*, 2/10.

NEW U. S. NAVAL SCOUT BOAT.—The 50-foot torpedo boat which is to be built by the Greenport Basin and Construction Co. for the U. S. Navy and which is to make 43 miles an hour and carry quick-firing guns and have a 16-inch torpedo tube, is to be driven by two 6-cylinder Harbeck motors of 300 horse-power each. This craft is something entirely new and somewhat of an experiment. It is to be used as a patrol and scout boat and will be different from those used by the Allies in that it will be powerful enough to resist enemy vessels.—*Shipping Illustrated*, 19/2.

MOTORBOAT SUBMARINE DESTROYERS FOR U. S. NAVY.—Plans for two types of motorboat submarine destroyers designed to have a speed of at least 41 miles an hour, have been submitted to the Navy Department. Models will be constructed at once at the Washington Navy Yard and tested to determine whether the engines the designers propose to install will develop power for the required high speed.

The department recently obtained bids from several boat builders on craft of this type, but there was such a wide variation in the power proposed for boats of approximately the same size and lines that a test was decided on to determine just how much power would be required.

The boats are primarily intended to be carried aboard capital ships, two to a battle cruiser, and to form an inner protective screen against submarines when a fleet or squadron is at anchor or cruising slowly on station at sea. From the experiments with these craft, however, a standard type of motorboat for submarine patrol duty along the coasts and off harbor entrances in time of war probably will be developed.—*Scientific American, 26/2.*

BIDS FOR BATTLESHIPS.—In reply to a request from Mr. Padgett, chairman of the House Committee on Naval Affairs, for information concerning the bids for battleships 43 and 44, Secretary of the Navy Daniels, on February 8, sent him data concerning the bids from private contractors, giving the following figures:

New York Shipbuilding Company.—One vessel in accordance with the department's design, subject to certain exceptions enumerated, $7,700,000. The exceptions amounted to $368,100.

Newport News Shipbuilding and Drydock Company.—One vessel in accordance with the department's design, subject to certain exceptions, $7,775,000. The exceptions were $465,500.

Fore River Shipbuilding Corporation.—Four bids, each for one vessel in accordance with the department's design. Bid 1, $7,638,000; bid 2, $7,684,000; bid 3, $7,750,500; bid 4, $7,229,500. The estimated value of the omissions of the four bids were as follows: No. 1, $521,000; No. 2, $407,000; No. 3, $340,500; No. 4, $861,500.

The Department's circular to prospective bidders on these vessels stated that no bids would be considered which proposed a period of construction in excess of 34 months. Prior to the opening several of the prospective bidders protested against this provision, stating that under the prevailing condition of the labor and material markets it would be impracticable to guarantee completion in that period. The contractors were then informed that a bid containing a time guarantee in excess of 34 months would not be thrown out on that account, but preference in consideration would be given to bids proposing the shortest time for construction. Mr. Daniels in commenting on the bids submitted, said in his letter:

"In view of the fact that the amount authorized by Congress for the construction of these ships was $7,800,000 each, and the lowest cost of construction by private contractors was $8,068,100, or $268,100 in excess of the sum the Secretary of the Navy was authorized to expend, no recourse was open but to decline to make an award at a figure above the legal authorization. Added to this insuperable reason why the contract could not be awarded to either of the private shipbuilding concerns upon their bid, was the additional fact that neither company guaranteed to complete the ship at any fixed date within a reasonable time. The Newport News company frankly placed forty months as the shortest time for delivery, and the other bidders were equally frank in pointing out that delay must be expected, so that they could give no assurance of early completion. On the contrary, as will be seen, the companies pointed out the reason why, if awarded the contract, the government must expect delay in the completion of the ships.

"The New York Navy Yard estimated that it could build a ship within 36 months at a cost of $7,069,923. It is estimated that $100,000 will be

needed for plant improvements. The Mare Island Navy Yard estimated that it could build a ship for $7,413,156, including certain necessary preparations for construction, estimated at $244,748. It also stipulated that other money would be needed to further equip the yard during construction. Their estimates showed a saving of $654,944 over the lowest bid of the private shipbuilding companies, and a time of construction of 31 months after receipt of structural material. Even with a necessary delay to extend the ship and provide other equipment at Mare Island, it is believed that the government can complete the ships at as early a date as any of the private shipbuilding yards, all of which are crowded with private contracts.

"Before awarding the building of these ships to the navy yards, I took the precaution of making contracts for steel and armor plate, with guarantees of prompt delivery for all material needed, so there will be no unnecessary delays. The machinery is now under advertisement. The price quoted for the steel needed in construction was slightly lower than the estimate previously made by the two yards awarded the contract.

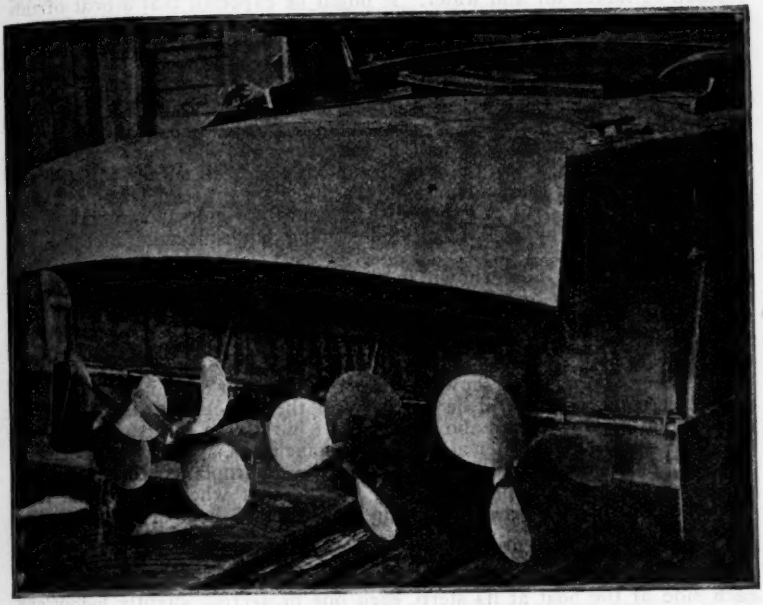
"The prompt action by the House of Representatives in authorizing the expenditure of $600,000 of the $1,920,769 between the lowest bids of the private shipbuilders and the navy yard estimates will enable the Navy Department to lose no time in making every preparation so that the work can be pushed to the utmost as soon as the ways are clear."—*Army and Navy Journal*, 12/2.

REPORT ON U. S. SHIPBUILDING FACILITIES.—A complete report on the capacity of private yards for building purposes and the possibilities of developing government yards to take care of contemplated construction of battleships, has been made to the Secretary of the Navy and will be presented to the House. This information was conveyed to the House Committee on Naval Affairs last week by Civil Engineer Homer R. Stanford, U. S. Navy, who was testifying before the committee. Engineer Stanford indicated that the Navy Department had been carefully investigating the possibilities of developing the navy yards so as to correlate their activities and bring them to a high state of efficiency. He indicated that it might be wise to construct an additional dry dock at the New York Navy Yard.—*Shipping Illustrated*, 22/1.

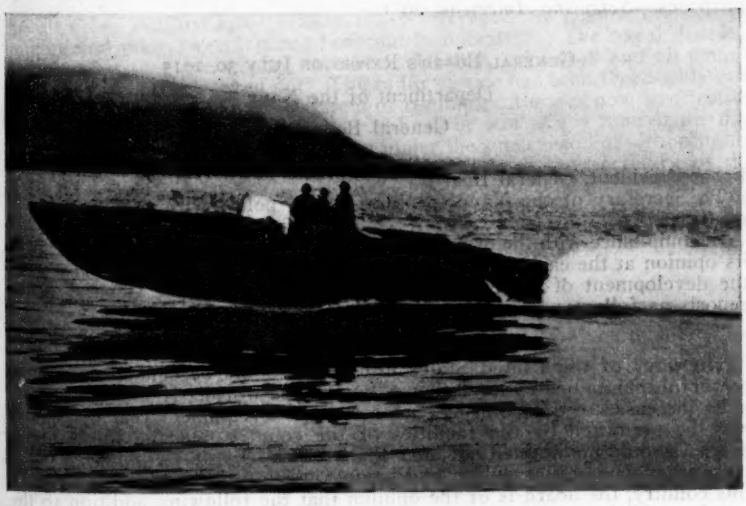
SPEEDY PATROL BOATS FOR THE U. S. NAVY.—The novel motor boats known as "sea-sleds," originated by a designer in Nova Scotia, have been found so speedy, and also so dry and steady in rough water, that they have been adopted by the United States Navy for various purposes, and recently a specimen of this type has been tried out for duty as a fast patrol or picket boat, for which work it is expected that it will be particularly efficient. Armed with a couple of light rapid-fire guns a boat of this kind could easily run down the most powerful submarine, and its great speed should enable it to avoid the shots fired by craft of any kind.

As will be seen from the illustrations the sea-sled is not a handsome craft, but greatly resembles a scow, with flat, vertical sides and square bow and stern. Its special feature is the underside arrangement, for the member that answers as a keel starts at the middle of the deck, at the bow, and extends, by quite a flat curve, to a point near the stern, where the bottom of the boat is flat. This construction forms a gradually diminishing V-shaped trough extending longitudinally through the hull, and the outline of the boat in the side view shows the chine at the lower edge of the vertical side, and not the keel line.

As the sides are flat and vertical, and as the width of the boat is somewhat greater at the bow than the stern, there is no tendency to throw water above the deck line, but on the contrary all spray is collected in the V-shaped opening at the bow and carried under the bottom, thus making a very dry boat in rough water. It is claimed that considerable quantities of air are also collected by the V-bow, and forced under the boat, so that it rides on a



STERN VIEW OF THE SEA-SLED



SEA-SLED RUNNING AT HIGH SPEED

cushion of mixed air and water. It might be expected that a boat of this description would pound badly in rough water, but it is claimed that this is overcome by the air cushion, above mentioned; and the great proportional beam makes a steady boat, as far as rolling is concerned.

Besides being unique in design the method of propelling these boats is unusual, as what is known as surface propulsion is employed. In this system the shaft of the wheel is set at about the water-line, at the stern, and the propeller wheel revolves half in the water and half out. Special advantages are claimed for the system, and it has been successful with the sea-sleds. Some of these advantages are the slight draft of water required, the absence of any strut or exposed shaft, and the rigid support that can be given the wheels, by well lubricated stuffing boxes located in the stern framing of the boat.

In the particular boat shown in the illustrations, which is the largest that has been built, four propellers are fitted, each driven by its own individual gasoline engine; and these screws work in pairs, one pair turning to the right, and the other pair to the left. This is distinctly shown in one of the illustrations.

The other two pictures show the boat running. In one of these the boat is just starting, and it will be noticed that the wheels are throwing up a great cloud of spray, high above the stern; but as the craft gathers speed the disturbance of the water at the stern is much less, and the boat begins to "plane," in the same manner as the ordinary hydroplane. This is shown in the second picture, and it will be noticed that when running at high speed practically no spray is thrown up forward, and the boat slides over the water very smoothly.

Owing to the light draft of the boat, and the arrangement of the wheels, the steering presented a problem. This was solved by hanging a rudder on each side of the boat at its stern, each one projecting slightly below and behind the hull. Only one of these rudders operates at a time, and they are hung on a hinge at their forward end which is set at an angle, so that they cut under when swung out, and this tends to pull the inward side of the craft down on the turn, thus counteracting the heeling effect.

Unusually high speeds are attained by these peculiar boats, and it is anticipated that they will prove useful in the navy for a number of purposes.—*Scientific American*, 29/1.

GENERAL BOARD'S REPORT OF JULY 30, 1915

Department of the Navy

General Board

WASHINGTON, July 30, 1915.

From President, General Board.

To Secretary of the Navy: Subject, naval policy with present requirements:

In compliance with the oral order of the Secretary of the Navy to express its opinion at the earliest practical date as to a policy which should govern the development of the navy and a building program, the General Board reports as follows:

POLICY

The navy of the United States ultimately should be equal to the most powerful maintained by any other nation of the world. It should be gradually increased to this point by such a rate of development year by year as may be permitted by the facilities of the country, but the limits above defined should be attained not later than 1925.

In pursuance of this policy, and having in mind the present facilities of this country, the board is of the opinion that the following addition to the naval establishment should be authorized this year, and recommends the

same for your consideration; this addition is believed by the board to be within, and practically at the limit of, the facilities at present existing.

Four battle cruisers, four dreadnoughts, six scouts, 30 coast submarines, seven fleet submarines, 28 destroyers and six gunboats.

Auxiliaries—One destroyer tender, two fleet submarine tenders, four fuel oil ships, one supply ship, one transport, one hospital ship, one repair ship and one ammunition ship.

Air craft service (lump appropriation), $5,000,000.

Personnel:

Eleven thousand men. This number will provide for the needs of the present ships of the navy, including those nearing completion, but it must be borne in mind that the personnel, commissioned, warrant and enlisted, will have to be further increased as the new construction progresses.

Increased facilities for the navy yards and shore establishments generally, such as dry docks, berthing spaces, building slips, structural shops, cranes for handling heavy weights, shop machinery, ammunition and other storage facilities, civil personnel, etc.

GEORGE DEWEY.
—*Flying*, January.

FUNCTIONS OF OFFICE OF NAVAL OPERATIONS.—The Office of Naval Operations is really performing the functions of a general staff, according to Rear Admiral Benson, Chief of Naval Operations. Although it has been in existence only a year, much has been accomplished toward placing the navy on a war basis. Without additional legislation the office has taken steps towards the organization of the industrial resources of the country behind the navy, but the work of the office is hardly under way. Admiral Benson tells us that "although the Office of Naval Operations has been in existence only since May, 1915, definite plans for the mobilization of the entire naval force of the United States have been approved and put into operation which brings into active cooperation all the various bureaus and elements of the Navy Department, together with the part each naval station is to play in case of war. The industrial resources of the country have been largely listed and their possibilities and capabilities in case of need tabulated. All vessels of the merchant marine have been inspected and their particular duties in case of war assigned, and everything which is necessary to fit them for war duty has been carefully thought out. An immense amount of detail has been worked out and is on file for ready reference. A definite division of mining and mine sweeping has been put in operation. The naval districts and the part they are to play have been definitely organized and all details are being carefully worked out. The radio service has been thoroughly and completely organized, and the system of communications is now so effective that messages to every part of the world can be sent at any time of the day or night, and this division has been put under the supervision of a thoroughly trained naval officer within fifty feet of the desk of the Secretary of the Navy, and is in immediate touch with the officer and officials of every department. Many detail plans are being worked out which in a short time will accomplish all that by human foresight it is possible to do by any system that could be designed, call it a general staff or not."—*Army and Navy Journal*, 4/3.

COMPLETION OF SUBMARINES "L-1, 2, 3 AND 4."—With reference to a statement in the January-February number, reprinted from *Shipping Illustrated*, as to the status of the submarines *L-1, 2, 3*, and *4*, the Fall River Company makes the following statement:

"The engine troubles that developed on *L-1* to *4* were primarily due to salt water leaks in the lubricating oil, in spite of which one boat completed her engine trials, and after these were corrected another boat passed all trial requirements. However, it has not been considered that there was sufficient margin of safety against successive heating of the wrist-pin

bearings, to rectify which a large sum of money was expended and many experiments were carried out to insure engine performances on these boats that will be satisfactory under all conditions. *L-1* and *3* have now completed their official trials and they will be delivered to the government as soon as new separators which are now being fitted to their batteries at the government's request and as a change under the contract, are installed and the *L-2* and *4* with the same modifications in the engines completed, will run their trials within the next couple of weeks. These engines operated perfectly and are very highly recommended by those who witnessed the trials."

NOTE.—These vessels were on February 28 undergoing additional trials, and it is expected that they will shortly be accepted.

NAVAL INTELLIGENCE OFFICE REORGANIZED AND ENLARGED.—The Bureau of Naval Intelligence is now being reorganized and enlarged, by Admiral Benson, upon orders from the Secretary of the Navy. The European war has developed the fact that the facilities of this bureau for securing information are totally inadequate, in what respect is not divulged, nor is it stated what is to be done to enlarge its facilities and how it is to be reorganized. All that is admitted is that there is to be a change in its organization and methods. There is an impression throughout the navy that other countries have ways of securing information relative to our sea defences much in excess of that obtained by our Navy Department concerning foreign powers. The hearing before the House Committee on Naval Affairs developed the fact that the department has no definite information as to the size and the number of submarines that are in the fleets of the belligerents. The Allies have sunk more German submarines than that country had at the beginning of the war if the information collected by the Navy Department is correct. It is said that there is a dearth of reliable statistics on the caliber of the guns of the larger navies. The War Department has a well-organized division of information in the War College and this has been invaluable in securing data upon which reports to Congress have been based. Other than the reports made public, it is stated that the War College has submitted confidential information to the Senate Military Committee which has guided the committee in formulating its bill. The Secretary of the Navy is anxious that the Naval Intelligence Bureau be similarly equipped and organized for the same purpose. He insists that a well-organized intelligence bureau is more important to the navy than to the army, as there are more features of a sea force that can be kept secret. Not the least of these is the character of the armor plate that is being used in foreign navies.—*Army and Navy Journal*, 1/3.

INVESTIGATING INDUSTRIAL PREPAREDNESS.—Out of the 48 state squares branch 240 sub-squares, each representing the individual field of investigation of that number of committeemen selected by the five leading scientific bodies of the country—the American Institute of Mining Engineers, the American Society of Mechanical Engineers, the American Institute of Electrical Engineers, the American Chemical Society, and the American Society of Civil Engineers.

Now, these five men in each state will go forth to learn and to list everything in their commonwealth that will be available for the use of Uncle Sam in an emergency. They will locate and classify all our coal, iron, and other mineral resources, so that they may be protected at their source. They will gain a knowledge of the capacity of the mines and mills of the country, and the extent to which they will be able to respond when called upon. They will gather information as to the capacity of every industry which may be capable of supplying things that are needed for the sinews of war.

Industrial preparedness means something more than mere capacity to make shells. The field covers food, clothing, hospital equipment, motors, animals, and telephone, telegraph, and railway accommodations. It also

means that the government should not only know where these industries are and what they can do, but those in control of the industries should know what is expected of them—that is, the exact nature as well as the volume of the requirements.

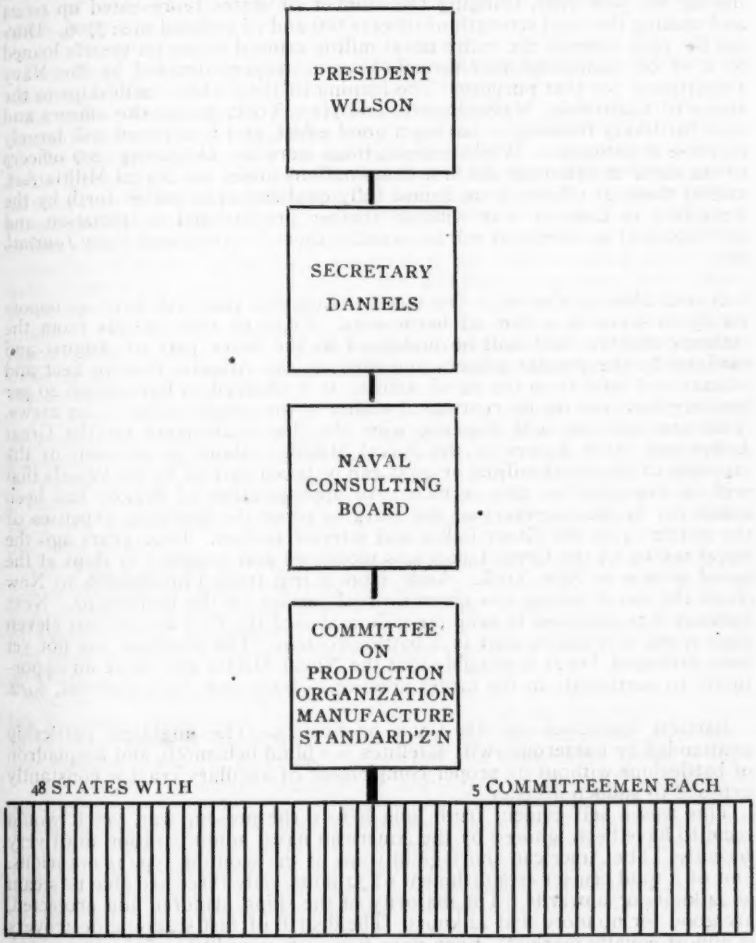

PRESIDENT WILSON
SECRETARY DANIELS
NAVAL CONSULTING BOARD
COMMITTEE ON PRODUCTION ORGANIZATION MANUFACTURE STANDARD'Z'N
48 STATES WITH
5 COMMITTEEMEN EACH
240 SCIENTIFIC MEN WORKING FOR INDUSTRIAL PREPAREDNESS WITH
35,000 SCIENTIFIC SOCIETIES MEMBERS AS ASSOCIATE HELPERS

Diagram showing the machinery of investigation that has been set in motion by President Wilson to ascertain just to what extent the industries of the United States can aid the policy of preparedness to which the President is committed.

Germany reveals how high a plane of effectiveness may be reached when there is scientific cooperation between government and national industries. Government inspectors go about among the plants and manufactories of the country and ascertain exactly just to what extent the plant or the factory can aid in government work.—*N. Y. Times Magazine*, 6/2.

NAVAL MILITIA DEVELOPMENTS.—Referring to his belief in the need of the naval militia in addressing the Naval Militia Association at the new Willard Hotel, Washington, January 29, Mr. Daniels spoke of its further growth, and said: "Texas and Hawaii added organizations to the naval militia during the past year, bringing the number of states represented up to 24 and making the total strength of officers 606 and of enlisted men 7706. During the past summer the entire naval militia cruised either on vessels loaned to it or on battleships and torpedo-boat destroyers detailed by the Navy Department for that purpose. The loaning of three older battleships to the states of California, Massachusetts and New York, giving the officers and men battleship training, is having a good effect, and is believed will largely increase enlistments. While examinations were not obligatory, 200 officers of the naval militia took the first examinations under the Naval Militia Act, and of these 41 officers were found fully qualified to be called forth by the President in time of war without further professional examination and certificates of qualification will be issued to them."—*Army and Navy Journal*, 5/2.

NAVAL MILITIA CRUISE.—The naval militia this year will have an opportunity to serve in a fleet of battleships. Eight or nine vessels from the Atlantic reserve fleet will be mobilized in the latter part of August and manned by the regular officers and men on the Atlantic reserve fleet and officers and men from the naval militia. It is planned to have about 40 per cent regulars and 60 per cent naval militia in the organization of the crews. This arrangement will dispense with the fleet maneuvers on the Great Lakes and other waters by the Naval Militia. About 50 per cent of the strength of the naval militia, or 4500, can be taken care of by the vessels that will be available for this service. An appropriation of $77,000 has been asked for by the Secretary of the Navy to cover the traveling expenses of the militia from the Great Lakes and interior section. Four years ago the naval militia of the Great Lakes was mobilized and assigned to ships at the naval review in New York. Aside from a trip from Philadelphia to New York the naval militia was given no real service on the battleships. Next summer it is proposed to keep the militia aboard the fleet for at least eleven days when it is taking part in a battle problem. The program has not yet been arranged, but it is possible that the Naval Militia may have an opportunity to participate in the target practice.—*Army and Navy Journal*, 19/2.

BRITISH CRITICISM OF OUR LACK OF SCOUTS.—The mightiest battleship unattended by numerous swift satellites is a blind behemoth, and a squadron of battleships without its proper complement of ancillary craft is constantly exposed to sudden disaster.

This was a self-evident truth long before the present war, yet it would seem to have been ignored by the American naval administration until very recently. The American shortage in ships of the scouting type is notorious. Out of a total cruiser establishment of 32 units, only three are able to steam at 24 knots or upwards. The majority of the ships, armored and protected, are good for no more that 22 knots. The dearth of fast seagoing destroyers is almost equally marked. Even now, however, very little of the discussion in progress on the defence bills has any relation to an adequate supply of the scouts, big destroyers, and other auxiliaries which expert opinion has declared to be more urgently needed at the present moment than additional capital ships.—*Naval and Military Record*, 12/1.

BRITISH NAVY'S INCREASE DURING WAR.—According to the *New York World* of December 16, the naval attaché reports that "every available yard in the British Islands is working right round the clock in turning out ships at an unprecedented rate. Great Britain has laid down or completed more vessels since the war began than the entire tonnage in the American Navy. This means that within a year the British Navy will be about 300 per cent

stronger than America's, unless Germany destroys a section of the fleet." It is clear from the newspapers that this unparalleled effort by Great Britain to maintain her unassailable naval supremacy, despite the vicissitudes of war, has profoundly impressed American opinion.—*Naval and Military Record*, 12/1.

THE NAVY PERSONNEL BILL.—H. R. 12540, Mr. Padgett.—To increase the efficiency of the personnel of the navy and marine corps.

SECTION 1 provides for the appointment of three midshipmen by each senator, representative and delegate in Congress; two for Porto Rico; three for the District of Columbia; 20 each year at large, 10 of these to be selected by the Secretary from sons of officers and enlisted men of 20 or more years' service, sons of former officers and enlisted men. These 10 are to be chosen by competitive examination. Candidates must be between 16 and 20 years of age.

SEC. 2.—That the authorized strength of the commissioned line of the active list of the navy, exclusive of the admiral of the navy and officers borne on the navy list as additional numbers, shall be 30 rear admirals, such number of commodores as may qualify under the provisions of this act, 100 captains, 200 commanders, 400 lieutenant commanders, and such number of lieutenants, lieutenants (junior grade) and ensigns as may qualify under the provisions of this act.

The increase of rear admirals is to be such as will provide for 7 annual promotions in that grade; that of captains, commanders and lieutenant commanders by annual increments of one-fifth. The grade of commodore is re-established with pay of captain, except when commanding squadrons, divisions or flotillas, when their pay is to be that of rear admiral of the lower half. An annual report is to be made to Congress of the number of officers and men required.

SEC. 3 provides for the detail to permanent duty in engineering, ordnance, law or aviation of officers applying not above lieutenant in the navy and captain in marine corps, and who have successfully completed special courses or passed special examinations. Such officers shall be additional numbers and shall be advanced without regard to sea service by examinations in their specialty.

SEC. 4.—The medical corps is to be increased by five annual increments, not including additionals, reserves or dentists to 25 medical directors (captains), 50 medical inspectors (commanders), 100 surgeons (lieutenant commanders), and 325 surgeons (lieutenants and lieutenants, junior grade).

SEC. 5.—The pay corps, exclusive of additionals and admirals, shall be 17 pay directors (captains), 34 pay inspectors (commanders), 68 paymasters (lieutenant commanders), 206 paymasters (lieutenants, junior grade, and ensigns). Paymasters are to be recommissioned without examination. Grades of assistant paymaster and passed assistant paymaster are abolished, those in these grades to be recommissioned without re-examination. Increase is to be in annual increments for five years and decrease in lieutenant commanders to be two for each year.

SEC. 6 amends Sec. 1383, Rev. Stat., concerning paymasters' bonds.

SEC. 7 abolishes corps of professors of mathematics.

SEC. 8 provides for 10 naval constructors, captains; 20 commanders; 40 lieutenant commanders; 80 lieutenants, lieutenants, junior grade, and ensigns. The increase to be distributed over five years. The grade of assistant naval constructor is abolished, those holding it being recommissioned as naval constructors without further examination.

SEC. 9 provides for three civil engineers, captains; six commanders; 31 lieutenant commanders, lieutenants, junior grade, and ensigns. The grade of assistant civil engineer is abolished, those holding it to be recommissioned as civil engineers without re-examination. The number of captains is to be increased immediately, and that of commanders one in each year.

SEC. 10 provides for 25 master boatswains; 25 master gunners; 50 master machinists; 20 master carpenters; 5 master pharmacists, and 25 master pay clerks; one-fifth of the increase in each five years. They shall rank after ensigns and ahead of officers of chief warrant rank and have the pay, etc., of lieutenants, junior grade. After three years' service and subject to examination, they may be commissioned lieutenants, junior grade, in the several corps to which they belong.

SEC. 11 abolishes the act limiting the appointment of machinists to 20 annually and authorizes the increase of chief pharmacists and pharmacists to 2 for each of 5 years.

RESERVE LIST

SEC. 12 establishes a war reserve of commissioned officers who shall be required to perform active duty for two months annually to insure their proficiency, receiving active pay, etc. Otherwise they shall receive retired pay, and may be transferred to the retired list on the same conditions as officers of the active list. They shall retain on the retired list the rank they held at the time of transfer. Sec. 1440, R. S., shall hereafter apply only to officers of the active list.

SEC. 13.—On and after June 30, 1920, captains aged 57 or over shall be placed on the reserve list; and on and after June 30, 1921, captains of 57 years, commanders of 52 years, lieutenant commanders of 48 years, and lieutenants of 45.

SEC. 14.—Line officers of the navy whose employment is restricted by law to shore duty only, officers who have been specially detailed for permanent duty in engineering, ordnance, law and aviation, and officers of the medical, pay and construction corps of the navy, shall be placed on the reserve list, on and after June 30, 1921, as follows: Commanders of 57, lieutenant commanders of 52, and lieutenants of 48.

SEC. 15.—Officers of the marine corps shall be placed on the reserve list as follows: Colonels at 60, lieutenant colonels at 65, majors at 50, captains at 45.

SEC. 16.—Officers retired shall receive pay as follows: With less than 11 years' service, 75 per cent; with 11 years' service, 27½ per cent; and for each additional year's service thereafter, 2½ per cent additional retired pay. The total retired pay not to exceed 75 per cent. This is not to apply to officers retired for total disability, or disease incident to service; and no officer retired shall receive increase of pay from this act. Officers shall be credited with service from the dates which they now take precedence. Sec. 1445, R. S., is repealed.

SEC. 17 repeals Sec. 1454, R. S. Officers retired for incapacity not the result of service shall have not to exceed one-half pay or be wholly retired with one year's pay.

SECS. 18-27 provide for examinations for appointments to the navy and marine corps; substitute a medical examination for promotion in lieu of the physical examination now required. Officers found morally unfit are to be discharged. Examinations are not required for appointment carrying temporary advance in rank. Prescribe the character of examining boards; repeal Sec. 1505, R. S., as amended. Officers below the rank of commander, or of lieutenant colonel, marine corps, found not professionally qualified, are suspended for six months, or in some cases for one year, with a corresponding loss of numbers. Provision is made for boards of examination.

PROMOTION BY SELECTION

SECS. 28-33 provide for the recommendation for the advancement of officers by their superiors in rank. The Secretary of the Navy shall send annually to such officers (superiors in rank) the names of candidates in their respective corps, showing the duties performed by, and the names of the immediate commanding officers of, each such candidate during his

service with the rank he then holds together with the marks assigned, his reports on fitness by a board. In the case of candidates with the rank of lieutenant in the navy or captain in the marine corps, the list shall cover service in the navy with the rank of lieutenant and lieutenant (junior grade), or in the marine corps with the rank of captain and first lieutenant. The superior officer having particularly in view the duties of officers of the rank to which advancements are to be made shall thereupon recommend in writing to the Secretary of the Navy the names of the candidates he deems the most deserving of advancement. With the name of a candidate for advancement will be furnished his professional records, made during his service with the rank he then holds, together with copies of all letters attached to said records: Provided, That in the case of candidates with the rank of commodore, said summary shall cover service with the rank of commodore and captain. In addition to being subject to recommendations by officers similarly employed, such officers shall be subject to recommendation by line officers whose employment is not so restricted. When candidates for advancement, such officers shall be promoted in not less than the same percentage as those officers of the line whose employment is not so restricted and who are then candidates for advancement to the same grade. Additional number following the regular number receiving the number of recommendations, or when the regular number stands immediately ahead of him in recommendations, becomes eligible for advancement. In case of ties the senior shall be preferred.

SEC. 34.—Midshipmen upon graduation should be commissioned in order of seniority.

SEC. 35.—Ensigns after three years' service shall be subjected to a competitive professional examination according to which they shall be graded or wholly retired if unfit with one year's sea pay.

SEC. 36.—Seniority of ensigns shall be determined first, by their marks at the competitive examinations; second, by average marks in general professional fitness; third, by their final marks upon graduation, or in the case of non-graduates by the average marks obtained in competitive examinations prior to their commission.

SEC. 37.—Ensigns shall hereafter take rank in the corps to which they may be assigned according to their seniority as above determined. This shall not apply to ensigns due for promotion prior to August 1, 1916, nor to those undergoing instruction preliminary to appointment in some corps of the navy.

SEC. 38.—Lieutenants (J. G.) to be promoted to lieutenants after 8 years' service, the date of a non-graduate to be determined by the date of the graduate immediately preceding him. An officer gaining or losing service shall be considered as having gained or lost, in total service, and in service in his grade or rank, length of service accordingly for the purposes of advancement and precedence.

SECS. 39-40.—Promotion from the grade of lieutenant commander to that of rear admiral shall be as heretofore. Lieutenants, lieutenant commanders and commanders shall be eligible to promotion after five years' service, three of which shall be at sea.

SEC. 41.—On June 30, 1916, captains who have completed 34 years' service since graduation shall be entitled to promotion; on June 30, 1917, those of 33 years' service; on June 30, 1918, and on June 30, 1919, those having 32 years' service; and on June 30, 1920, and thereafter, those who have then served not less than two years at sea in the grade of captain and whose total service in that grade is not less than six years.

SEC. 42.—Commodores and captains who, on June 30, 1916, have completed 33 years' service shall be eligible for promotion to rear admiral; on June 30, 1917, those of 32 years' service; on June 30, 1918, those having not less than 32 nor more than 38 years; and on June 30, 1919, those having not less than 32 nor more than 37 years' service. On January 1, 1920, and on each following first day of January, those commodores of not more than 57

years of age who have then served at sea in the grades of commodore and captain a total of not less than two years and those captains who have then served not less than two years at sea in the grade of captain and whose total service in that grade at the close of that fiscal year will be not less than five years, shall constitute the candidates for promotion to fill vacancies occurring in the grade of rear admiral during the following fiscal year.

SECS. 43-46.—Provide for the advancement of surgeons, paymasters, naval constructors, and civil engineers after service of three years in case of surgeons with the rank of junior grade, five years in the case of others, with the exception of eight years in the case of civil engineers. Naval constructors and civil engineers up to and including the rank of lieutenant shall be advanced with the officers of the line immediately preceding them in precedence.

SEC. 47.—Boatswains after service of six years shall undergo a competitive professional examination for advancement to master boatswain, being graded according to the order of merit established by such examination. Chief gunners, chief machinists, chief carpenters, chief pharmacists and chief pay clerks, respectively, may be advanced to master gunner, master machinist, master carpenter, master pharmacist and master pay clerk, respectively, subject in all respects to the conditions governing the advancement of chief boatswains to master boatswain.

MARINE CORPS

SEC. 48.—The total enlisted strength of the marine corps shall be 20 per cent of that of the navy.

SEC. 49.—The officers shall be 4 per cent of the enlisted strength, distributed in the proportion of four colonels to five lieutenant colonels, 14 majors, 37 captains, and 62 first or second lieutenants. The grade of brigadier general is established, the promotion of an additional number to this grade to be held to fill the vacancy. The promotion to major general shall be from officers not below the rank of colonel.

SEC. 50.—The staff department shall number 8 per cent of the enlisted strength, one-fifth to be adjutants and inspectors general, one-fifth paymasters, and three-fifths quartermasters.

SEC. 51.—No further permanent appointments shall be made in the staff department. The lower grades are to be filled by details of four years from the line, and the upper grades by appointment of officers of the staff department having a vacancy with the rank of colonel, an officer of the line to be detailed in case there is no officer with the rank of colonel in a given staff department. Appointments of higher officers shall be for a term of four years and the officers so appointed shall be recommissioned in the grade to which appointed.

SEC. 52.—That at any time prior to July 1, 1921, any officer holding a permanent appointment in any staff department, may, upon his own application, be reappointed in the line of the marine corps in the grade and with the rank he would hold on the date of his reappointment if he had remained continuously in the line.

SEC. 53.—That vacancies in the grade of second lieutenant shall be filled, first, by the appointment of midshipmen; second, by the appointment of warrant or non-commissioned officers of the marine corps who have served therein not less than one year and who are not over 30 years of age; and third, by the appointment of graduates of colleges and military or technical institutes between the ages of 20 and 24 years.

SEC. 54.—Second Lieutenants shall be promoted after three years subject to a professional examination, failing in which they shall be wholly retired. Seniority shall be determined on promotion by the order obtained in this examination.

SEC. 55.—For the purposes of advancement in rank to captain, major, lieutenant colonel and colonel made prior to July 1, 1921, all commissioned

officers of the line and staff of the marine corps shall be placed on a common list in the order of seniority each would hold had he remained continuously in the line. All advancements in rank to captain, major, lieutenant colonel and colonel prior to July 1, 1921, shall, subject to the usual examinations, be made from officers with the next junior respective ranks, whether of said line or staff, in the order in which their names appear on said list.

SEC. 56.—After June 30, 1921, advancement in rank to captain shall, subject to the usual examination, be made as heretofore provided by law.

SEC. 57.—Captain, majors and lieutenant colonels of line and staff shall be eligible for promotion after five years' service, subject to the usual examination.

SEC. 58.—That original vacancies created in the grade of brigadier general within one year of the date of approval of this act shall be filled by the President by selection from officers senior in rank to lieutenant colonel. Other vacancies in the grade of brigadier general shall be filled under the provisions of the following section:

SEC. 59.—On January 1 of each year all officers with the rank of colonel shall constitute the candidates for advancement to brigadier general, subject to the usual physical examination. They shall rank in the order of the number of recommendations thus received.

SEC. 60 establishes the warrant grades of marine gunner, quartermaster clerk and pay clerk and provides for the appointment of 20 marine gunners, one quartermaster clerk for each commissioned officer serving in the quartermaster department, and one pay clerk for each commissioned officer serving in the paymaster's department, is hereby authorized. Officers in those grades shall have the rank, etc., of warrant officers and be appointed from a non-commissioned officer. Clerks now serving as quartermasters' and paymasters' clerks with field service shall be eligible for appointment as such and credited with their previous service in the field, army, navy or marine corps. Clerks now serving as clerks for assistant paymasters shall be warranted pay clerks and after one year the position of field clerk in the quartermaster department and clerk for assistant paymaster shall be abolished. Nothing contained in this act shall be held to reduce the active duty pay or allowances of any person in the naval service.

SEC. 61.—That officers of the marine corps with the rank of colonel who shall have served faithfully for 45 years on the active and reserve lists shall, when retired, have the rank of brigadier general; and all such officers who shall hereafter be retired at the age of 64 years before having served for 45 years, but who shall have served faithfully on the active and reserve lists until retired shall, on the completion of 40 years from their entry in the naval service, have the rank of brigadier general.

PROMOTION BY SELECTION. *Admiral Fletcher's Strong Argument Against it.*—I have listened to arguments for and against selection during my whole naval career, and am convinced that promotion by selection would be determined to the best interests of the naval service. This conviction is shared by the majority of the higher ranking officers.

The arguments used in favor of selection are based upon incorrect assumptions and incorrect comparisons. They do not present the actual conditions of the commissioned personnel of the navy.

The principal argument in favor of promotion by selection is that such a system is in use in every walk of industrial life. The inference is drawn that selection would be best for the navy.

This comparison fails to take into account the radical difference which exists between the widely varied abilities of the personnel in a large commercial organization, and the more nearly equal abilities of a body of educated officers.

In a business organization, all classes of people are employed representing every degree of intelligence from those who have the rudiments of an education to those who have the highest technical training. Here selection

is a necessity. It is manifest that no other method can be pursued. From the common laborer to the manager each man is selected for his special class of work, for each is a specialist in his particular line.

Naval officers, after a strict weeding process, have all been graduated at the same school. They are all given the same training and are all required to meet the same standard of efficiency. No officer can be promoted before his ability to perform the duties in the new grade has been thoroughly established. They are all so nearly of the same ability that it is an extremely difficult matter out of 90 per cent of them in any one grade to tell who will be the best man in the future. The past performance of over 90 per cent of any one grade has been of a high and satisfactory standard, and there has been relatively little difference in the ability of any of them.

How then shall we pick this one or that one and say that in the future, in the next grade, this man will be superior to the large majority of his equally endowed fellows who are practically as able as he?

In the grades of lieutenant and lieutenant commander, where there is employed the more strictly technical knowledge of gunnery and engineering, a high reputation has often been made by officers who, upon arriving at command rank, are never heard of professionally.

The naval profession requires expert knowledge in nearly every phase of human activity; it requires knowledge of engineering, electricity, navigation, seamanship, law, ordnance, gunnery, tactics, strategy, military organization, and command. Many officers have specialized in one or another of these technical subjects, and have become widely known, through their work in that specialty. Others are known as good organizers and handlers of men. All are needed to make an efficient service, and one not more than another. What qualifications are to be given preference in selection for promotion? Are we to select the best ordnance officer, or the best engineer, or the best tactician, or the plodding man whose even balance and sound judgment enable him to give a correct decision where a brilliant specialist may fail; or are we to select through some intricate mathematical process of voting? These officers are a body of experts; the selection of who are the best is only a fancied discrimination.

The next argument advanced in favor of selection is that it stimulates officers to make greater exertion in the performance of duty, and is an incentive for a more strenuous striving toward excellence. The theory of itself sounds true, but does not apply where there already exists an extraordinary amount of incentive to excel.

Among naval officers the highest incentive to duty is the commendation of fellow officers. A keen rivalry in gunnery, engineering and tactics exists among the ships of the fleet and officers labor to be stamped by their fellows as efficient and successful men. In addition to the praise of their fellows there is official recognition by letters of commendation from the President and from the Secretary of the Navy. There is still a further incentive from the certainty that the efficient officer will be chosen for the responsible positions. All of these far surpass the incentive given by the money compensation which comes with increase of rank.

Anyone who is familiar with the spirit of officers in the fleet, and who knows how much every captain and his officers are wrapped up in the work of making his ship attain the highest efficiency; and who knows how keen is the disappointment when his efforts fail; well knows that additional stimulus is unnecessary.

Too much incentive among men equally qualified may be more detrimental than beneficial. When efficient officers labor under the constant strain that their promotion may be in doubt, and that some more fortunate and probably less efficient officer may be passed over their heads, there is bound to be produced an unhealthy condition. Minds will be bent more towards ways and means of securing promotion than toward the prosecution of the tasks of gunnery and engineering.

The form of selection that exists in our service to-day is the proper and logical one. It is selection to the responsible positions and selection to positions for which officers are particularly fitted. For example, an officer is selected to be a gunnery officer of a dreadnought or of a cruiser, to be an engineer of a fast turbine ship or one of the older type, to command a submarine or a destroyer, to command a dreadnought, to perform the duties of Chief of Bureau, Chief of Operations, General Board, War College, etc. Flag officers, too, are selected in accordance with their ability to handle the responsible situations in command of divisions, squadrons and fleets.

This form of selection answers every argument, and fulfills all the requirements of any form of selection needed in the naval service. It gets the right man in the right place; it gives a just regard for merit; and it furnishes every incentive and spur to excel.

All of these worthy things are accomplished now without introducing the evils that come with "selection for rank," or promotion by selection, as it is popularly styled.

Flow of Promotion.—The reason that promotion by selection receives any following at all, even among the younger officers and in spite of its evil effects upon a military service, is because it has invariably been linked with some scheme for providing a more rapid flow of promotion.

The method usually proposed for creating vacancies, so that selection can then be used to fill them, is to retire or place in reserve officers who have obtained a certain age in the various grades. This has met in Congress the same opposition that was encountered by the Plucking Board; namely, that Congress is reluctant to retire or place in reserve an able-bodied and able-minded man who receives pay but renders no service to the government.

If a means can be devised by which men are not kept in idleness while enjoying a government salary, it is believed that Congress would enact any reasonable legislation.

There is a slight flow of promotion due to deaths and retirements in the upper ranks. There is, in addition, a certain deterioration in men which may be placed at about three or four out of every hundred. With these few removed the efficiency of the men left is of a high standard. The efforts of an able flag officer may be of no avail if his captains are not of a high average. As you look down the battle line and feel that every captain is of good sound judgment and can be depended upon you feel that the strength of your line is assured.

How futile and what turmoil is caused by trying to select for rank from this majority of equally able men. The few in the higher grades who are not of the high average of the majority are men ably qualified for many positions in the government service. They can be assigned to those positions which are already of considerable expense to the government and can render excellent service for many years.

This will solve not only the question of flow of promotion, but will at the same time settle the question of officers receiving remuneration without rendering service to the government. I would suggest that this problem be solved by the following act:

"The President of the United States is authorized to transfer annually not exceeding 4 per cent of the captains, commanders and lieutenant commanders from the active navy list to other duty in the government service, and such officers will not thereafter be in the regular line of promotion."

By the passage of this act the naval service will, as a whole, be made more efficient and will be spared the evils of promotion by selection. The government is at the same time saved money by reason of officers transferred being placed to work.

There are many positions in the government service which naval officers are well qualified to fill, and many which they formerly filled. These may be found in the lighthouse service, coast survey service, consular service, diplomatic service, and in the naval service itself, as inspectors of ma-

chinery, and as officers in certain offices of the Navy Department and at navy yards. There would be no difficulty in finding two or three hundred positions of this character that would amply take care of the overflow from the line.—*Army and Navy Journal*, 11/3.

NAVIGATION

BELLINI-TOSI DIRECTION FINDER.—Notice has been given by the U. S. Hydrographic Office of the installation at the U. S. Naval Radio Station, North Truro, Mass., of a Bellini-Tosi direction finder, fitted for

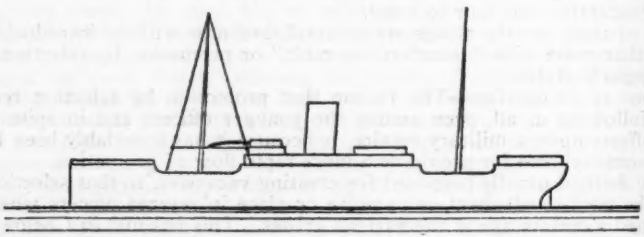


FIG. 1

the purpose of ascertaining the true bearing by radio waves of a ship from the radio station, North Truro, as well as the true direction of the radio station from the ship, thus affording a new aid to vessels navigating the waters of Cape Cod in determining their position by radio. From tests already conducted, the direction finder has been found to be correct within about 2 degrees and request is made of merchant vessels fitted with radio to cooperate with the department in these experiments whenever they are

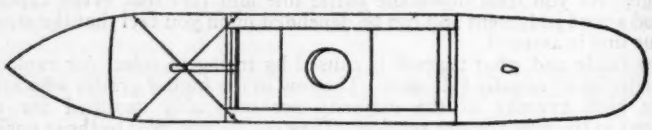


FIG. 2

within range of North Truro by asking their bearings from that station and informing it how such bearing checks with the ship's observation. The direction finder, although it has been on the market for some four years, is so little known to the average navigator that an explanation of its method of operation will be of interest. It is the invention of two Italian naval officers, Bellini and Tosi, and its operation depends on the use of a directive aerial, *i. e.*, one in which the strength of the signals received depends on the direction from which they come. The direction finder can be used either to enable a vessel to locate its own position, or that of an approaching vessel from a vessel or shore station. It does not give magnetic bearings, but is azimuthal and positions are given with regard to the ship's axis; the position of the axis being determined from the magnetic compass. The direction finder does not give one absolute direction for position, but gives two possible directions, one exactly opposite to the other. Thus a wireless station on the port bow may be the starboard quarter at exactly 180 degrees

from the port position. The port or starboard position of a land station is generally known, and in any case can be accurately determined by two successive readings. The range of the direction finder varies with the strength of the sending station and size of aerials fitted; when used with a standard ship wireless set it is from 25 to 60 miles. It is completed independent of weather conditions and the two main aids which it affords to navigation are: (1) Determining the ship's position with regard to any coast station; (2) finding the direction of an approaching or overtaking ship. The direction finder is formed of three main parts—the receiving aerials, the radio-geniometer and the detector.—*Shipping Illustrated*, 4/3.

THE NORTH MAGNETIC POLE.—The late Dr. Aksel Steen, director of the Norwegian meterological service, had charge of working up the magnetic observations made by Amundsen on his Northwest passage of some years ago. *Terrestrial Magnetism* publishes a letter written by Dr. Steen, shortly before his death last May, stating that two or three years more would be required to complete the work. The writer declares that it will be impossible to give a definite position for the north magnetic pole, because, in his opinion, this pole "is not a fixed point attached to a certain geographical latitude and longitude, but must be defined as that point on the surface of the earth where the horizontal intensity at the moment is zero." The discussion of Amundsen's observations will probably show that the pole has a mean daily and yearly periodic motion, together with more or less irregular displacements. A mean position for the pole can perhaps be determined, or else it may be possible to define a closed curve within which the pole will always be found.—*Scientific American*, 12/2.

SIGNALLING AT SEA.—A method of estimating distances at sea in fog or thick weather, which is partly electrical in character, was described before a recent meeting of the Royal Society, London, by Professor J. Joly. The system depends for its successful operation upon the different velocities of disturbances in different media. If aerial and submarine signals are simultaneously emitted at a lighthouse station or lightship, the lag of the aerial compared with the submarine sound is about 4.3 seconds to the nautical mile. An approaching ship picking up the signals and measuring the lag to an error even of one second, becomes aware of her distance to less than one-quarter of a mile. Similarly, wireless signals and submarine signals, or wireless and aerial signals, may be used. If the faster moving signals be sent out in groups, the individual signals being spaced to regular intervals, say of one second, and the slower moving signal be always emitted simultaneously with the first signal of a group, the navigator has only to count the faster signals till the slower signal reaches him in order to estimate his distance from the signal station. In this case the signals themselves tell him his distance, and no actual time measurements are required on board ship. It is shown that this system enables the mariner to determine his position completely under all circumstances which may arise. Prof. Joly showed how an extension of this method could be applied to the problem of avoiding collision in fog. It was pointed out that if vessels possess the means of emitting a loud and crisp sound signal which can be sent out simultaneously with a wireless or a submarine signal, the determination of distance rendered possible thereby, along with wireless information as to course and speed, will enable the navigator on each ship to determine with certainty (1) whether there is risk of collision or whether there is no risk, and (2) the point upon his own course, and the moment at which collision is threatened.

The solution of the problem is based upon the fact that at each instant the rate of mutual approach is the maximum if the ships are advancing so as to collide. A simple geometrical construction, which, by its character, is unlikely to involve error, enables the mariner to solve the problem immediately the signals are received.—*Shipping Illustrated*, 4/3.

ORDNANCE AND GUNNERY

16-INCH GUNS FOR BATTLESHIPS

WASHINGTON, February 26.

Experimental long-range firing by the Atlantic fleet and information about naval battles in the European war virtually have convinced the Navy Department that battleships to be authorized this year should carry ten 16-inch guns each, instead of twelve 14-inch weapons. Ships of the *Pennsylvania* and *California* class, now built or building, carry the 14-inch guns.

Details of gunnery are confidential, but it became known to-night that the next target practice of the fleet will be held at ranges up to 18,000 yards because of the lessons taught by the battle between German and British battle cruisers in the North Sea, where 17,000-yard shots scored hits.

The Navy General Board recommended some time ago that new battleships be designed for the 16-inch rifles, and proposed other military characteristics that made it necessary to increase the tonnage from 32,000 for the *California* class to 36,000. Officials of the board have urged their views upon the House Naval Committee in connection with the pending appropriation bill, although the 1917 building program is not yet before the committee. Many officers of high rank, however, have considered it unwise to mount the bigger guns or build the bigger ships. Secretary Daniels has not as yet announced what his recommendation to the committee will be, but confidential reports from the fleet are said to have about convinced him of the desirability of the bigger ship project.

An order for the first kite balloon to be added to the navy's aerial fleet has been placed, it was learned to-day, and this latest device to increase the accuracy of gun fire may be tested out during the Spring target practice. It is proposed that each battleship be equipped with a captive kite balloon which will rise 1000 feet above her decks. The officers observing the fall of shots, now stationed in the fighting tops 150 feet above decks, will be stationed in the balloon basket, communicating with the gunners by telephone. From their great elevation they will be able, it is thought, to direct salvo fire with deadly accuracy at targets invisible from the ship itself.

The navy's biggest guns now have a range of 12 sea miles or more, and this will be increased materially with the new 16-inch guns. Before the House Naval Committee recently Admiral Winslow said he had seen weather conditions in which ships were plainly visible at 30,000 yards, or fifteen miles. It probably was due, he said, to a mirage, but if he had guns of sufficient range he thought he could have gauged his shots so as to make a bombardment effective.

Another new feature probably will be added to the fleet this spring when the armored cruiser *North Carolina*, carrying six aeroplanes and their crews and a device for launching the aircraft in any weather, joins Admiral Fletcher's command. The aerial scouts for the first time will play an important part in the maneuvers and possibly in target practice.—*N. Y. Times*, 27/2.

PREPARATIONS FOR INSTALLING 16-INCH GUNS.—A model 16-inch gun has been built at the Washington Navy Gun Factory and tried out at Indian Head. The Bureau of Ordnance has all the plans prepared and can begin to turn out 16-inch guns as soon as the department decides to equip its dreadnoughts with them. Plans have also been prepared in the Bureau of Construction and Repair for 16-inch-gun ships, and it is only a matter for the department to decide. Not only will the new ships have greater gun power, but it is stated that they will have higher speed. With the electric drive the speed of the new ships has been increased about a knot an hour.—*Army and Navy Journal*, 4/3.

AN 18-INCH MODEL REPORTED IN HAND.—The Bethlehem Company is reported to have an improved 18-inch model in hand. It is by no means improbable, therefore, that monster weapons of this type will shortly be adopted as the standard armament of American dreadnoughts. They are especially recommended for mounting in the battle cruisers which, after years of agitation, are shortly to be laid down. Unofficial information gives these vessels a designed speed of 30 knots and a battery of eight of the heaviest guns consistent with displacement.—*Naval and Military Record*, 12/1.

RUMORS OF 17-INCH AND 17.5-INCH GUNS.—It has been rumored in the British press that England's new battle cruisers mount 17-inch guns and have a displacement of 42,000 tons. (Some rumors say 52,000 tons.) It has also been rumored that Germany has 17.5-inch guns afloat.

Little credence is given to these reports in naval circles.

17-INCH NAVAL GUNS AN OLD STORY.—Reports current from abroad that the German Admiralty is mounting 17-inch guns in the Kaiser's latest superdreadnoughts recall the fact that guns of 17 inches on warships are by no means new, for the British and Italians had guns of this caliber back in the seventies. They weighed 100 tons each. The Italians later provided the 100-ton 17-inch gun with arrangements for both breech and muzzle loading appliances. Eight 100-ton guns with a diameter of 17.72 inches were ordered from the works of the Armstrongs at Elswick, England, by the Italian Government in the seventies for the turret armament of the *Duilio* and *Dandolo*, and eight more of the same size guns were ordered in 1897 by the Italians. The latter guns were breech loaders. They used a battering charge of 551 pounds of powder and a projectile of 2000 pounds. Drawings were made at Woolwich arsenal, England, for a gun to weigh 160 tons in the seventies to be capable of sending a projectile through 36 inches of iron at a range of 1000 yards. The Messrs. Krupp had a design for a 122-ton gun in the seventies, slightly exceeding eighteen inches, to throw a steel shell of 2205 pounds or a chilled iron shell of 2271 pounds. It will be no problem for present naval architects to provide for the mounting of 17-inch guns on new ships. Some of the new German dreadnoughts were designed to carry 15-inch guns, and it is perfectly possible that they have arranged for batteries of increased caliber. It would not be surprising if the British were also providing for guns of 17-inch.—*Army and Navy Journal*, 5/2.

AIRCRAFT BOMBS MENTIONED IN ORDNANCE REPORT.—Among the interesting items mentioned in the annual report of Rear Admiral Strauss, chief of the Bureau of Ordnance of the Navy Department, is the manufacture of bombs for use by aircraft. It is stated in the report that these have proved satisfactory in tests and that more will be manufactured. Another interesting item is that relating to a 1-pounder gun which has been developed by the bureau for use on aeroplanes. Plans are under way for increasing the caliber of this gun. There is now being manufactured a large number of 3-inch anti-aircraft guns for use on all battleships, while designs have been made for a similar type of 4-inch caliber.—*Scientific American*, 23/1.

GERMANY'S SUBSTITUTE FOR COTTON.—Germany's supply of cotton, so necessary for the manufacture of modern high explosives, is low enough that a diligent search is being made for adequate substitutes. England has cut off the foreign supply and thousands of tons are demanded for comparatively short campaigns.

So far the hope has been that cellulose from some special wood might be nitrated successfully into gun-cotton, but that success has not yet been reported. A measure of success in getting a substitute has been obtained, however, in using certain forms of paper pulp, lignin, etc., as a dressing

for wounds, thus saving some of their precious cotton for explosives. One firm in Berlin is selling "Lignin" as an absorbent for blood at a price of about eight cents per pound in hundred pound lots. It is put up in sheets about 14 by 24 inches and in packages of eight pounds or rolls of two pounds.

One of the most effective wound dressings among these substitutes is sphagnum moss which to some extent had been used in both England and Germany before the war. The moss is so full of minute tubes that in its ordinary state it holds nine times its own weight of water and is therefore a powerful absorbent when dry. It is very soft and light. Gathered from swamps, it is dried on rocks or bushes until bleached white, then cleaned and sterilized.—*N. Y. Times,* 2/3.

FLOATING MINES WITH PERISCOPES.—Floating mines, equipped with what at first appear to be periscopes, are said to be the latest device used by the Germans in bringing about the destruction of enemy ships. Captain B. J. Keelty, of the British steamship *Hartfield,* which arrived here from London to load grain, to-day told of having sighted one of the new destructive agents in the English Channel.

According to Captain Keelty, what he thought was the periscope of a German submarine was sighted about half a mile from his ship. What was most singular about it was that it apparently remained in the same spot. There is a $2500 reward offered by the British Admiralty for ramming a submarine and visions of it flashed across the mind of Captain Keelty.

On second thought Captain Keelty concluded to waive the possibility of getting the $2500 and proceeded on his voyage. Shortly afterward a British patrol boat was sighted and spoken to and the commander was told of the sighting of the supposed periscope. An investigation immediately followed, which developed that the "periscope" was attached to the mine. —*N. Y. Times,* 2/3.

MOBILE COAST DEFENCE.—The exponents of the Luellen-Dawson mobile armament installation are advocating the adoption of this means of coast defence by heavy guns and mortars mounted upon specially built railway carriages, which can be transported, readily and rapidly, over the railroads from point to point, rather than upon the present system of fixed fortifications, detection of which by aeroplane scouts and spies is practically assured in modern warfare. The believers in this new system, who have obtained the advice and criticism of ordnance experts, base their plan upon two lessons taught by the war abroad: (1) That concealment from the enemy of artillery material is of paramount importance, and (2) that the combatant possessing artillery of superior weight and range has a very pronounced advantage over an antagonist. They also say that wagon roads and bridges in the United States are scarcely adequate for the safe transportation of artillery material above 4.7-inch or 6-inch calibers, whereas the railways are equipped for the efficient transportation of much greater weights. From these facts they argue that the expansion in the power of artillery should be associated with railway transportation, in so far as mobile artillery is concerned, particularly in view of the immense strategic advantage involved in the ability thus secured to move batteries from one point to another and thus baffle the enemy's attempts at striking them. Moreover, the length of our coastlines and the number of our seaports requiring defence are held to prohibit the protection by permanent fortifications of every point which might be threatened from the sea. But the mobile railway batteries devised by L. W. Luellen and his associate could be sent as easily to defend the shores of Georgia as the coast of Maine.

The idea is to install at fixed and predetermined points along existing railway lines or at desirable strategic points where railroad facilities may be installed suitable concrete foundations on either side of the rails to which gun cars may be locked to secure stability. It is estimated that these

bases would cost approximately $3000 to $4000 each, and that a total of 140 bases, costing only $500,000, would suffice to guard the coasts of Massachusetts, Rhode Island, Connecticut and New York, including Long Island and New Jersey. To cover this range of shore line the projectors of the plan estimate that there would be required 100 16-inch mortars, mounted two on a car, and 10 long range 14-inch rifles, mounted one on a car. This would mean sixty cars, and the entire expense of equipment of cars and guns is given as $9,000,000. In other words, they say, you could defend the shores of these five states for less than the price of a dreadnought, and the rest of the coast in proportion.—*Army and Navy Journal*, 4/3.

BATTLESHIP GUNS TO TEST MOBILE 10-INCH BATTERY.—The battleships *New York* and *Arkansas* have been ordered to Fort Morgan, Ala., at the entrance to Mobile Bay, March 12, to engage in a test of a new 10-inch battery, which has been constructed at the fort. The battery has been placed just inside the reservation fence, while observation towers have been built nearby from which officers will be able to determine the effect of the big guns aboard the war vessels when fired against the battery.—*Army and Navy Journal*, 4/3.

NEW FRENCH ANTI-AIRCRAFT GUN.—According to *Aeronautics*, it is learned from Allied sources that a new anti-aircraft gun recently adopted by the French armies has given the most satisfactory results. In its general lines, the gun resembles the famous 75 mm. quick firer; its recoil is rather less than three feet and the shell it fires weighs 35 pounds. The projectile is fired at a muzzle velocity of 1870 feet per second.—*Scientific American*, 22/1.

INVENTION TO SAVE SHIPS FROM MINES AND TORPEDOES.—An important invention offered the British Admiralty, according to advices from Copenhagen, Denmark, is an apparatus which it is asserted will prevent the destruction of ships by torpedoes or mines. It is the invention of Frantz Poulsan, engineer. The details, of course, remain a secret, but the principal nature is said to remain a secret, but the principal feature is said to be air masses formed by the explosion. The British Admiralty has promised to test it.—*Army and Navy Journal*, 5/2.

SHOULD SHIPS CARRY HOWITZERS? *By a Land Gunner.*—At the Dardanelles the *Queen Elizabeth*, firing over the peninsula destroyed a Turkish bridge of boats with a 15-inch gun, firing at about 17 degrees elevation. The latest British naval guns are capable of 20 degrees elevation, the German naval guns of 30 degrees. It is now recognized that howitzers are necessary to supplement guns for coast defence, as they attack a weaker part of the target than the guns—namely, the deck—and can therefore take on ships at which the guns are ineffective. On the same principle, a ship should carry howitzers. But owing to the rolling and pitching of the ship, it is not easy to hit anything with a howitzer, even if fired at the moment that the deck is horizontal. The author goes into elaborate calculations concerning the angle and rate of roll, and concludes that the expenditure of howitzer ammunition necessary to hit a battleship would be prohibitive, and that, until a stable mounting can be devised, ships should not carry howitzers.—Extracts from *Précis of Artilleristische Monatshefte*, July-August, 1915.

DIRECT AND HIGH-ANGLE FIRE. *By Lieut. General Rohne.*—At 45 degrees, and a few degrees above and below this elevation, the shooting of a howitzer is wild, and therefore shooting at the higher angles should be undertaken from 50 degrees upwards. At 65 degrees some of the shell fall base first, while at 75 degrees they all fall base first, giving very irregular shooting. Therefore the practical limits for high-angle fire are between 50 and 65

degrees of elevation. General Rohne reckons that the lateral dispersion is in direct proportion to the time of flight, that is, about double the dispersion with direct fire; the dispersion in depth is, however, not much greater. The striking velocity is much the same as with direct fire, but the penetration against a horizontal target is from 2 to 5 times as much as with direct fire. Therefore for penetration it pays to use high-angle fire at over 50 degrees elevation, while for accuracy it pays to use the lowest elevation that will reach the target.—Extracts from *Précis of Artilleristische Monatshefte,* July-August, 1915.

STATISTICS OF LOSSES. *By Major General Richter.*—Whereas in previous wars the rifle has accounted for most of the killed and wounded, it is estimated that in the present trench warfare seven out of eight casualties are due to artillery fire, and most of the remainder to machine gun fire. The bayonet does more work than the rifle bullet. The greatest moral effect is produced by heavy artillery.—Extracts from *Précis of Artillertische Monatshefte,* July-August, 1915.

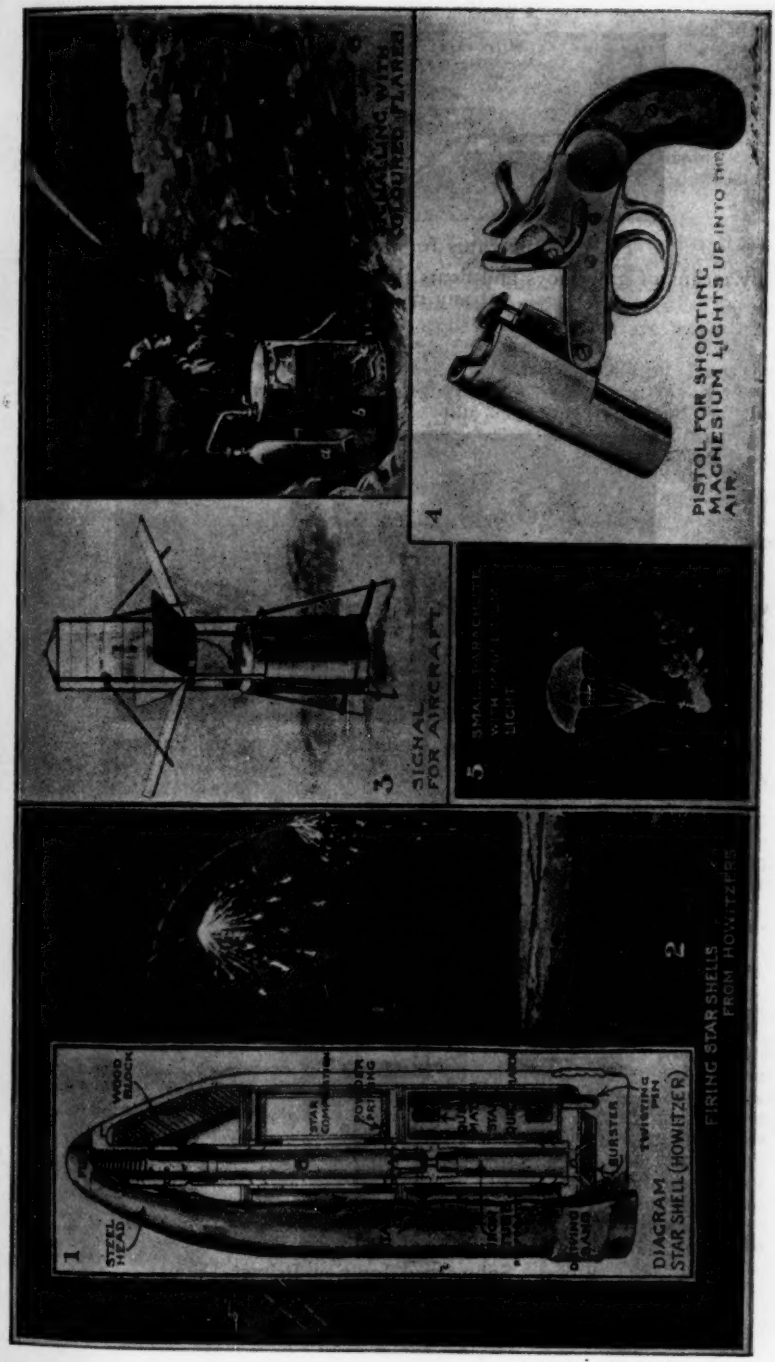
COTTON IN WAR.—The consumption of cotton for the manufacture of smokeless powder is, in peace time, 123,000 bales a year. In a nine-hours' engagement in the North Sea the powder fired by both sides was equivalent to 4500 bales; in the first attack on the Dardanelles the equivalent of 50,000 bales was shot away. The Americans now reckon that the consumption in 1915 will amount to 14,000,000 bales.—Extracts from *Précis of Artilleristische Monatshefte,* July-August, 1915.

WAR ILLUMINATIONS. *Various Methods that have Proved their Value.*—In order that operations in war may be carried on by night as well as by day, artificial light in many forms has to be resorted to. One of these forms, known as the star-shell (Fig. 1), is a projectile fired from a field gun, its fuse being arranged so as to burst the shell over the area to be illuminated (Fig. 2), or, alternatively, on impact with the enemy's earthworks. This particular device is very useful for detecting troops attempting a surprise attack.

The star-shell fired from the 3-inch quick-fire gun is fixed into a cartridge case the base of which contains the propelling charge; every round fired, therefore, takes the form of fixed ammunition. The corresponding shell used in the 6-inch howitzer and its propelling charge are, on the other hand, separate units. The star-shell itself is constructed on similar lines in each case. The body of the shell is an iron cylinder having a copper driving band round it near the base. A steel nose is attached to the body and screwed in at the forward end to take a fuse, either time or percussion, or a combination of both. The percussion-fuse carries a striking needle supported on a thin copper diaphragm. The diaphragm collapses when the fuse receives a smart blow on its nose, and the needle is driven against a percussion cap, in that way igniting the "quick-match," which passes down the tube shown in the center of the shell and communicates with the bursting charge in the base.

The shell has a wooden lining, and carries between this and the central tube a number of cylinders, each containing a composition which ignites from the quick-match in the central tube (see Fig. 1). These cylinders are scattered as the shell bursts, and burn for a considerable time giving out a brilliant light (Fig. 4). When used for "ranging," star-shell should be burst at such a height from the ground that the "stars" are all burnt out before they reach the ground. Otherwise, the herbage may be set alight and the smoke so produced obscure the target.

Small illuminating shells holding "Véry lights" are fired from a Webley and Scott pistol (Fig. 4). They are used for signalling purposes. The weapon has a range of about 500 feet, and the shell is attached to a parachute, which descends slowly during the 45 seconds that the composition


1
STEEL HEAD
WOOD BLOCK
DIAGRAM STAR SHELL (HOWITZER)
2
FIRING STAR SHELLS FROM HOWITZERS
3
SIGNAL FOR AIRCRAFT
4
PISTOL FOR SHOOTING MAGNESIUM LIGHTS UP INTO THE AIR
5

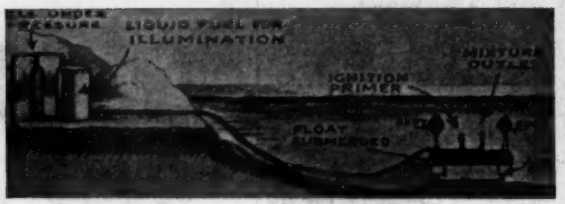


FIG. 7.—Apparatus for Sea-Surface Illumination

By means of gas, buoys and floats the apparatus is kept below the surface at any required depth

FIG. 8.—Apparatus in Action Lighting up the Surface

FIG. 9.—Submerged Ignition Primer Detail

remains alight (Fig. 5). The latest pattern of pistol has a detachable stock for alternative firing from the shoulder, as the "kick" is rather heavy for a pistol.

Aircraft can assist artillery operations at night by dropping fire-bombs fastened to parachutes. The slowly descending mass of burning composition gives sufficient light to enable gunners to pick up the range readily. *a*, cap; *b*, lump of potassium or sodium; *c*, weak india-rubber diaphragm closing top of tube; *d*, tube of liquid fuel illuminant. Pressure from liquid fuel reservoir ashore bursts the diaphragm and cap, setting the potassium alight from the water and igniting the liquid fuel.

In one type of star-shell the "stars" take the form of cylinders, in one end of which the illuminating composition is inset. The other end contains a folded parachute, which is forced out of the cylinder by a coiled spring after the "star" is liberated from the parent shell. The composition is ignited by the bursting charge of the shell itself, which contains twelve or more of these parachute-stars. Many kinds of flare-lights are in use for illumination in digging trenches at night, etc.

An acetylene flare, to which are attached four mirrors radiating from the source of light (Fig. 3), is used as a signal to aircraft.

The angular positions of the mirrors enable the airmen to "pick up" the light from several different directions. Fig. 6 shows a German device for the production of colored flares for transmitting signals. The particular color desired may be obtained by adding suitable chemicals to the combustible liquid with which the reservoir (*b*) is charged. Chloride of strontium produces a red flame; copper salt a green flame; and so on. A long or short flame may be produced my admitting more or less gas pressure to the reservoir (*b*) from the gas cylinder (*a*) alongside. The same apparatus is used for distributing asphyxiating gas, and in a portable form for projecting liquid fire. For modifications of this device for illumination on the surface of water, and the apparatus, see Figs. 7, 8 and 9.—*Illustrated War News.*

ENGINEERING

SOME COMPARISONS RELATING TO ELECTRIC PROPULSION OF A BATTLESHIP. *By Mr. W. L. R. Emmett.*—The Navy Department of the United States has awarded to the General Electric Company, of Schenectady, New York State, a contract for the electric propelling machinery of the new battleship *California*, which is being built at the New York Navy Yard. This ship forms a unit of the largest and most powerful class which has so far been adopted by the United States.* Her displacement is 32,000 tons, and her maximum speed is to be about 22 knots, requiring about 37,000 S. H. P.

The contract with the General Electric Company covers two turbine-driven generating units, four propelling motors (one for each shaft), switching apparatus, cables, instruments, two turbine-driven exciting units, and a complete equipment of condensing auxiliaries and ventilating fans, all driven by motors from the exciting units. In other words, it covers practically the entire engine-room equipment except the main condensers.

Each of the auxiliary units is of 300-kw. capacity, with a 240-volt direct-current generator geared to a high-speed, non-condensing turbine. These turbines will exhaust into either the heaters or main turbines, or into both. The motors which drive auxiliaries will be designed for a considerable range of speed variations, so that the auxiliaries will be adapted to economical conditions at different speeds of the ship.

The generators of the *California* are bi-polar alternators, and the motors are arranged to be connected either for 24 poles or 36 poles. For economi-

* The design of the new U. S. battleships of the *California* class was described and illustrated in No. 52, Vol. XI., of *The Shipbuilder.*

cal cruising at 15 knots or less, one generator will be used with motors on the 36-pole connection, but for higher speeds the 24-pole connection will be used. The ship will be capable of operating at a speed of about 18.5 knots with one generator.

Speed variation with either motor connection will be effected by change of turbine speeds through the agency of variable speed governors designed to hold automatically any desired speed with the usual ranges. This arrangement entirely prevents racing and makes it convenient to hold a fixed speed irrespective of variations in sea, weather, or steam conditions, a feature which should prove valuable in fleet operations.

The steam consumption guaranteed on the *California* covers the total steam required for the main turbines and engine-room auxiliaries as described above. The conditions are 250-pound gauge pressure, dry steam, with such vacuum as can be produced under trial conditions. The guaranteed water rates per H. P. delivered to the propelling shafts are as follows:

At 10 knots	14.6 lb.
At 15 knots	11.4 lb.
At 19 knots	11.1 lb.
Maximum speed	11.9 lb.

Very heavy penalties are imposed in the event of these guaranteed consumptions being exceeded on the trials, *viz.*, £5100 per pound for the two lower speeds, and £4100 per pound for the two upper speeds.

At full speed the *California's* propellers will make 175 r.p.m., this being about the lowest speed of propellers which is practicable within the space. The propeller speed proposed for the sister ships with Parsons turbine drive is 240 r.p.m., and comparisons by Dyson's method indicate that this speed will give the *California* an advantage of about 9 per cent in propeller efficiency.

TABLE VII.—Pounds of Steam to Main Engines per Hour per E. H. P.

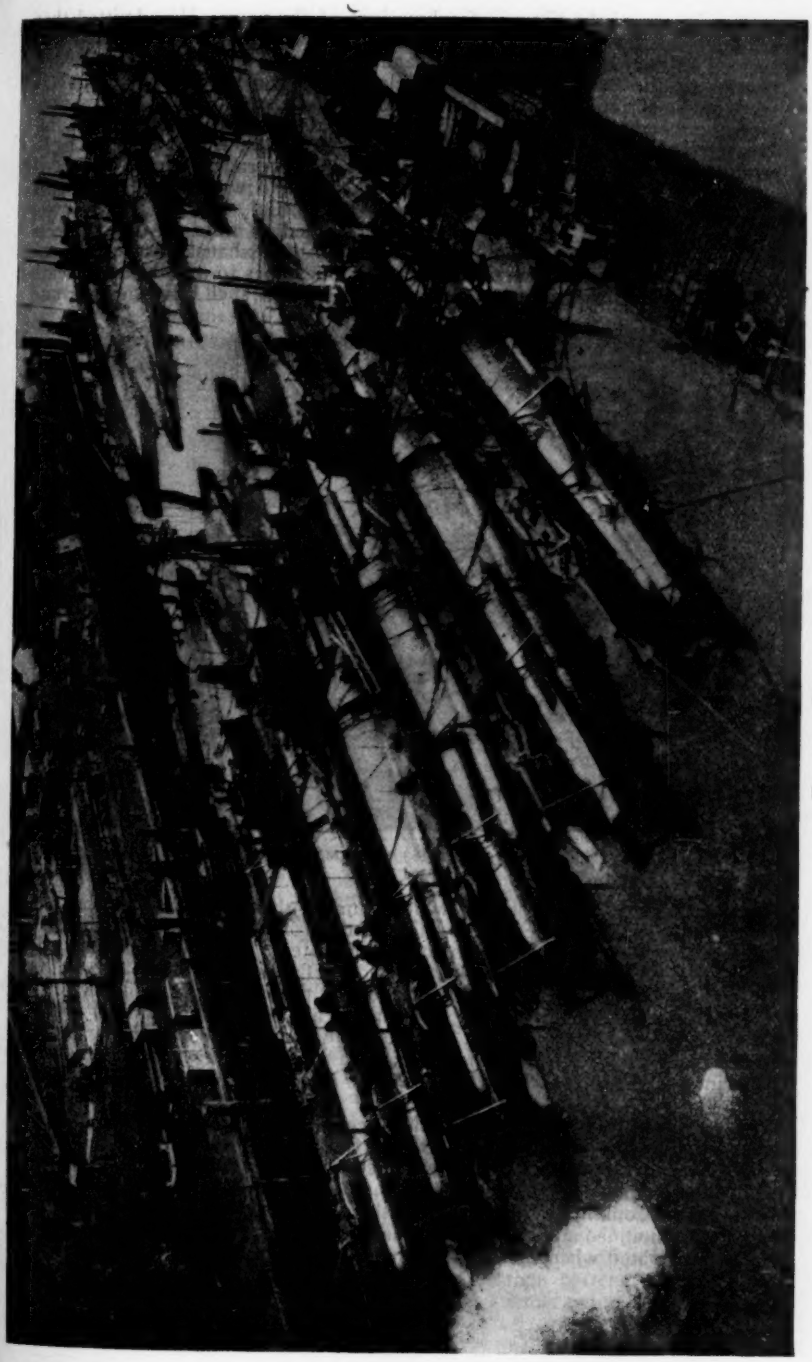
	12 Knots	15 Knots	19 Knots	21 Knots	Prop. Speed 21 Knots
Florida	31.8	....	24.0	23.0	328
Utah	28.7	....	20.3	21.0	323
Delaware	22.0	....	18.7	21.0	122
California	17.3	15.2	15.0	16.4	175

Table VII gives a comparison of steam consumption per E. H. P. between the *California* as guaranteed, the *Florida* and *Utah*, which are driven by Parsons turbines, and the *Delaware*, which is driven by reciprocating engines. These figures, which are taken from the published records of trials, afford a reliable basis for comparison of prime movers. The estimated weight of the propelling machinery of the *California* without condensing auxiliaries is 530 tons, while that of the turbines originally proposed was 653 tons.

The contract price for the propelling machinery of the *California*, together with auxiliaries, is £88,500, which is £41,000 less than the Parsons turbine equipment previously considered.—*Shipbuilder*, February.

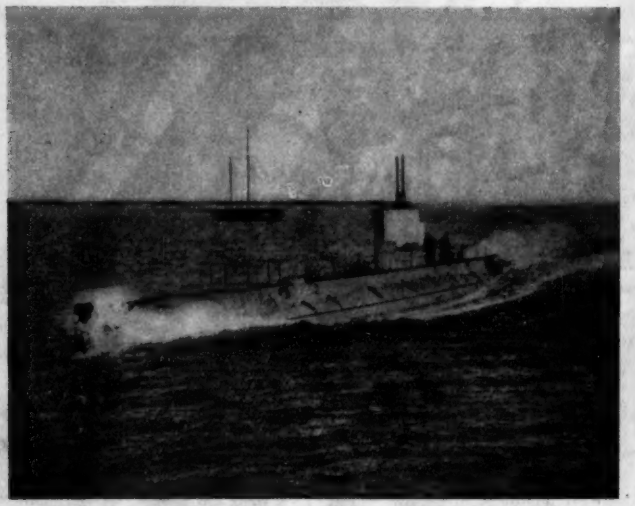
SUBMARINES

NEFF SYSTEM OF SUBMARINE PROPULSION.—Abner R. Neff, inventor of the Neff system of submarine propulsion by means of oil-burning engines under water, whose device has been referred to on several occasions, appeared before the House Committee of Naval Affairs to request the authorization by Congress of an appropriation to pay for the installation and tryout of his



BRITISH SUBMARINES

system in one of the *G* type of submarines of the navy. He admitted that although the device functioned perfectly under water, it was subject to two serious military defects—a visible wake and the noise produced by the discharge of the exhaust gases. He claimed, however, that these defects were not so serious as they were represented to be, and that in any case they were outweighed by the increased submerged radius at higher speed, increased power, increased habitability and better ventilation of boats so equipped over boats provided with the present storage battery system of propulsion. He also claimed that officers who had witnessed experiments with a small 75-ft. submarine near Long Beach, Cal., in 1913, which vessel was equipped with the Neff engine, had failed to note the two defects alleged. He explained that he took care of the exhaust gases from the engine by conducting them through condensing tubes to a point underneath the hull, where they were sprayed out of a clam shell arrangement and



"H-13" (BRITISH) STEAMING 13 KNOTS

carried back to the propellers, which churned them up again, so that they became so finely divided as to disappear before they could bubble up to the surface through from 30 to 60 feet of water. He explained that under his system compressed air was carried in flasks to provide oxygen for running the oil engine under water, and that there was no possibility of the development of deadly gases. Additional advantages he claimed for his invention were saving in first cost, as well as an enormous saving in battery renewals and repair charges, and a clean, roomy interior for submarines.—*Shipping Illustrated*, 19/2.

NEW FLEET SUBMARINES.—The new fleet submarines are practically duplicates of the *Schley*, under contract with the Electric Boat Co. for $1,350,000. The difference in cost between the earlier and the later boats to be contracted for is attributable to minor changes in specifications. It was stated before the House Committee this week that the plans of the *Schley* have had to be radically modified and that the boat as now building will be 7 ft. longer than was anticipated when the original plans were drawn.—*Shipping Illustrated*, 26/2.

INTERNATIONAL SUBMARINE SHIPBUILDING CO.—With $5,000,000 capital the International Submarine Shipbuilding Co. has been incorporated in Maine. R. H. M. Robinson, general manager of the Lake Torpedo Co., will be president of the new concern and Fred. B. Whitney, managing director of the Lake Co., will be counsel. It is not known whether the Lake Co. will be absorbed, but such is the understanding in Wall Street, as the new company is to build mercantile vessels as well as submarines.—*Shipping Illustrated*, 4/3.

SPEED REQUIREMENTS PRESENT DIFFICULTIES.—In a letter dated March 3, to the chairman of the House Military Committee, Mr. Padgett, the Secretary of the Navy, explains the difficulty he has found in carrying out the provision of the Act of March 3, 1915, which provided, among other things, for "two submarines, to be of seagoing type, to have a surface speed of 25 knots or more, if possible, but not less than 20 knots, to cost, exclusive of armor and armament, not exceeding $1,500,000 each." "It has been found wholly impossible," the Secretary reports, "from the present state of the art to undertake a submarine of 25 knots using oil engines for surface propulsion." To make 25 knots it would require about two and one-half times the horse-power of the *Schley*. This requires an entirely new design. When these designs were completed December 11, 1915, and bids were asked for no one bid for a 25-knot submarine. The best bid was that of the Electric Boat Company for two vessels at $1,490,000. This bid guaranteed a speed of 20 knots, the minimum mentioned in the appropriation act, but required the acceptance of the vessels if they made 19 knots, subject to a penalty of $20,000 per knot for lesser speed. The agreement as to the time in which the vessels could be constructed was also unsatisfactory, as was the requirement of the bidders that the maximum speed should be demonstrated, not by a four-hour trial as customary for all naval vessels for many years, but by three consecutive runs over a mile course. Concluding the Secretary says: "The department, in view of all the circumstances, feels that it cannot place a contract for these vessels at the only bid received within the limit of cost as modified above, without violating the obvious intent and purpose of the provisions of the law with reference to speed. The only alternative is to construct the vessels in navy yards, upon the steam-driven designs. The department, however, as at present advised, does not favor steam-driven submarines, and feels that it was not realized at the time of the passage of the act that the provisions for speed would necessitate construction containing this undesirable feature. This being the case, it is considered necessary to explain the whole situation as above, to the Congress, in order that it may indicate its wishes in the premises."—*Army and Navy Journal*, 11/3.

"E-2" SUBMARINE EXPLOSION.—The Navy Department has issued a statement relative to the explosion of the submarine *E-2* at the New York Navy Yard, which killed four men and injured 12 more. The conclusions reached by the board of investigation is that "the explosion was due to an excessive amount of gas; namely, hydrogen, generated from the storage batteries, forming with the air a high explosive mixture. That there were two pockets of this mixture, one at the after end of the after battery and the other at the forward end of the forward battery, and it appears that the initial explosion occurred at the after end of the after battery." The ignition was caused by a spark, the origin of which the board is unable to determine. "The condition of the batteries at the low voltage and amperage, 82 and 940, respectively, at about 12.25 p. m. would probably cause a reversal of voltage in some of the cells, and, in the opinion of the board, this caused the generation of an excessive amount of hydrogen gas."

The *E-2* was fitted with the new Edison storage battery designed to eliminate the formation of chlorine gas during submergence. The Edison

battery for submarines is nickel-iron-alkali type, composed of nickel, iron oxide and steel in a solution of potash. The potash acts as a preservative of all the combined elements, so that the battery elements do not destroy each other. The theory of it is this: The submarine is steel and floats in an alkaline solution of water. The battery is steel and contains an alkaline solution, so that the cause for the generation of chlorine gas does not exist. Following a series of exhaustive tests of every conceivable kind, a set of the new batteries was installed in the *E-2* last summer. The first official trial of the batteries in the *E-2* was made November 11, when the *E-2*, equipped with the Edison cells, made a trip up Long Island Sound. In an unofficial test a few weeks earlier it was reported that the *E-2* had done thirteen knots an hour for three and a half hours while submerged. The *E-2* is four years old and of the Holland type.—*Shipping Illustrated*, 22/1.

POSSIBILITY OF DISPENSING WITH THE MOTHER SHIP.—One of the results of the discussion in the General Board and before the House Committee on Naval Affairs of the submarine problem may be dispensing with the mother ship. The mother ship in the submarine flotillas has virtually been a floating base from which the undersea craft operate. As a substitute for mother ships it is proposed to establish small shore bases. With the development of the submarine the work to be done on the mother ships and at the bases has been greatly increased. At present the crews and experts on the mother ships number three or four times as many as the crews of the submarines. Only a small proportion of the officers and men assigned to the submarine flotilla serve on the submarines. It is contended that the work could be done with fewer men and at less expense at shore stations than on a mother ship. So far as coast defence work goes, the claim is now made that the mother ship is unnecessary. It is held that even the smaller submarines have sufficient radius of action to be operated from shore stations. Especially will this be true if an adequate number of shore stations is maintained for the submarine coast defence flotillas. Another advantage of shore bases for submarines is that the crews would have an opportunity to spend more time ashore. The work of submarines is exceedingly exacting, and men must have more rest and recreation than those of surface boats. It is stated that there are no mother ships in the German Navy, and if the submarines can be operated from shore stations under the conditions of the European war they could be handled in the same manner in defending the coast of the United States.—*Army and Navy Journal*, 26/2.

SPECIAL COURSE OF INSTRUCTION ON STORAGE BATTERIES FOR NAVAL MEN.—Last fall an electric storage battery manufacturing concern of Philadelphia initiated a scheme of instruction for the officers and men operating the submarines of the United States Navy. As a result, during the months of November and December each of these men spent one week in hearing lectures on storage battery design and operating delivered by the engineers of the battery company and were also given instruction in shop methods. Over 100 officers and men took this course. About five weeks' time was devoted by the concern to this work, and the men and officers expressed great appreciation of the help thus received.

The course of instruction was originally laid out by the storage battery concern and approved by Admiral Grant, chief of the submarine flotilla, and his aide, Captain Yates Sterling, Jr. It was then sanctioned by the Hon. Josephus Daniels, Secretary of the Navy.

Since the storage battery is a vital feature of every modern submarine and usually the least understood of all the equipment of such craft, the course of instruction that has been given the naval officers and men in this subject is highly commendable.—*Scientific American*, 11/3.

AERONAUTICS

EQUIPMENT OF GERMAN AIRCRAFT.—Details regarding a Teuton hydro-aeroplane which fell into the hands of the Russians in the Riga region are of unusual interest in that they disclose the thoroughness with which German aircraft are finished and equipped. To quote from the report of the *Morning Post* correspondent at Petrograd: "All the necessary manipulating parts of the machinery are made luminous at night with a radium composition. There is a special newly invented level to facilitate handling the 'plane in darkness, and a special compass, and seats are provided for three. The hydro-aeroplane carries a searchlight, a Maxim, and a rifle with an adequate supply of ammunition, and ten bombs, five on each side, of ten pounds weight apiece."—*Scientific American*, 22/1.

GERMAN BIPLANE OF DOUBLE FUSELAGE TYPE.—An account of the capture of a large German aeroplane appears in a recent issue of the *Russkoie*

A SQUADRON OF FIGHTING AEROPLANES AND AEROPLANE CHASERS "SOMEWHERE IN FRANCE." THERE ARE ABOUT 15,000 AEROPLANES IN USE IN EUROPE TO-DAY AND ABOUT 8000 AVIATORS FLYING THEM

Glovo, which states in part: "Some time ago on the northern front our artillery succeeded in bringing down a German biplane with two unusually large fuselages and two tails. Each of the armored fuselages contains two machine guns and a light, quick-firing gun, besides ammunition receptacles. Propulsion is by twin engines, each developing 170 horse-power. In the center, midway between the fuselages, but a little lower is the pilot's nacelle, protected by armor. The crew of the machine consists of six men, including pilot, observer and mechanic." Evidently, this machine is a modification on an ascending scale of the well-known "Fritz" type of biplane, which has made its appearance over the western front from time to time.—*Scientific American*, 19/2.

LOW-FLYING GERMAN AEROPLANE.—In contradistinction to the greater part of the aircraft engaged in the present war which, in order to secure immunity from anti-aircraft guns, fly at high altitudes, it is learned that the Germans have devised and introduced into service an aeroplane that flies below the line of fire of these guns. It is exceedingly fast and flies so low that anti-aircraft artillery cannot be trained on it so that the shells will burst with accuracy. However, in securing immunity from these guns

it comes within range of rifle fire and machine gun fire, and as a protection against these it is heavily armored. Flying close to the ground, the occupants of the new German aircraft are in a position to locate accurately the position of troops and masked batteries, and secure much military information of inestimable value.—*Scientific American*, 19/2.

U. S. NAVAL AERONAUTICS.—Captain Bristol advises that aircraft be treated as a new type of warship and handled by officers detailed for such duty, and not by a flying corps of civilians. He would have a reserve of trained officers and men supplemented by an organization of manufacturers and material producers. A mobile fleet of 82 aeroplanes, five dirigibles and 41 balloons should be immediately provided at a cost of $13,670,000, with a personnel of 430 officers and 852 men, to meet present requirements, to be ultimately increased to 638 officers and 1200 men. As officers are already instructed in battleship duty, Captain Bristol believes that preference should be given, over other branches, to the service now known by the name of "aviation" and which he would call aeronautics. There are now nearly ready for delivery one dirigible, 23 aeroplanes, 64 motors and 12 competitive motors. Manufacturers are showing a gratifying spirit of patriotic desire to aid the government in this matter, the profit not being sufficient to tempt them. Captain Bristol recommends for use on battleships dirigibles, the type experience is showing to be the most effective, being a better distance flyer than the aeroplane and having greater carrying capacity. The balloon types are useful for observation. It is expected that officers will soon be ordered to aviation duty.—*Army and Navy Journal*, 4/3.

Secretary Daniels cut the estimates made by Captain Mark L. Bristol, U. S. N., Director of Naval Aeronautics, for the Navy's aviation needs from $11,000,000 to $2,000,000, Captain Bristol told the House Naval Affairs Committee this week. He had urged the Secretary to raise the budget for aviation craft and equipment to $20,000,000 for the five-year building program submitted for the navy. A good part of the Secretary's pruning was concerned with two special aircraft ships or carriers, designed for the transportation and repair of seaplanes, which were to cost $3,000,000 each. Of the navy's immediate aviation needs he said that 1200 men would be required to operate the 82 aeroplanes, five dirigibles and 41 kite balloons he wanted for fleet equipment. And in addition to fleet equipment he said that there should be provided 120 aeroplanes, fifteen kite balloons and fifteen dirigibles for service as patrols, besides 46 aeroplanes for the naval militia. Under the five-year building program, he said that he figured on adding to the navy 185 aeroplanes, 15 dirigibles and 53 kite balloons, as well as 638 officers and 1106 men. Captain Bristol also told the committee that he did not believe in Secretary Daniel's plan for a special flying corps, in which any young man who could qualify as a flier might be commissioned without any preliminary naval training. Captain Bristol declared that aviation officers in the navy should have navy training as a prerequisite to flying.—*Army and Navy Journal*, 26/2.

HUGE AMERICAN-BUILT BATTLEPLANES FOR ALLIES.—It is announced by the officials of an American aeroplane manufacturing company that orders have been placed by the Allied governments for 11 huge battleplanes of most modern design. Each aeroplane will weigh in the neighborhood of 30,000 pounds, and the framework will be entirely of steel. It is said that the wing spread is to be 180 feet, while the length of the aeroplane from tail to propellers will be 104 feet. The framework will be constructed on the cantilever truss principle, insuring great strength with a minimum weight. Twin bodies will be used, each body carrying an engine of 800 horse-power. It is planned to arm the machines with four guns, two

fore and two aft, of a caliber of between 1½ and 2 inches, and capable of firing 20 to 40 shots per minute. Each airship will carry a number of bombs of any size up to 14 inches in diameter. The specifications call for a speed of 85 miles an hour with full load and a crew of six men.—*Scientific American*, 22/1.

INFERIORITY OF AMERICAN AEROPLANES.—Surely the words of Lieutenant J. E. C. Scott, a British aviator and aeronautical engineer, who is in this country on a diplomatic mission for his government, are not complimentary to domestic manufacturers of airships when he states that not a single aeroplane made in the United States is capable of the service demanded at the front. He adds that not a single motor made in this country is capable of rendering the service needed by Allied aviators. He attributes the shortcomings of American aircraft to two causes: first, our constructors are careless and do not take the pains in building their machines that the French and British makers do; secondly, they have not yet learned the requirements of military service.—*Scientific American*, 19/2.

RADIO

RADIO STATIONS OF THE UNITED STATES.—The Bureau of Navigation, Department of Commerce, has recently issued the 1915 edition of "Radio Stations of the United States." This list shows that there are now 5073 radio stations in the United States, an increase of 1139 since 1914. They are classified as follows: government and commercial land stations, 224; government and commercial ship stations, 895; special land stations, 118; general and restricted amateur stations, 3836.—*Scientific American*, 22/1.

THREE NEW STATIONS FOR U. S. NAVY.—With the approval of the contract between the navy and an American wireless company for the equipment of the radio stations at San Diego, Cal.; Cavite, P. I., and Pearl Harbor, Hawaii, one of the final steps has been taken toward linking the United States with its overseas possessions. Not only will radio communication be possible between Washington and the insular possessions, but it will also be possible to send dispatches to almost any point in the world. The stations under construction at Pearl Harbor and Cavite will be the most powerful in the world; the continuous range of these stations being in excess of 4700 miles.—*Scientific American*, 5/2.

PROPOSED GOVERNMENT RADIO MONOPOLY.—The last annual report of Captain W. H. G. Bullard, superintendent of the Navy Radio Service, contains a recommendation that the government control and operate all coastal radio stations within the jurisdiction of the United States, in such manner establishing a practical monopoly for the transmission of all government business. For some time there has existed considerable friction between the naval radio men and the wireless amateurs, and often the threat has been heard of late that the navy is soon to control all wireless communication in this country.—*Scientific American*, 5/2.

WIRELESS COMMUNICATION BETWEEN UNITED STATES AND JAPAN.—The Japanese Government recently notified the Marconi Wireless Telegraph Company that the new station at Funabashi, near Tokio, was completed and would be ready for trans-Pacific communication at an early date. Experiments that have been going on between that station and Honolulu are reported to be most successful, and no difficulty is being experienced in maintaining communications over the 3400 miles that intervene. In some instances the Japanese station has been heard at San Francisco, a distance of 5600 miles. The Funabashi station is rated at 300 kw. Were it not for the fact that Japan is engaged in war, the station would probably be in active service to-day.—*Scientific American*, 5/2.

RADIO STATION FOR THE SOCIETY ISLANDS.—According to an announcement made by the United States Bureau of Navigation, it is learned that a powerful radio station has been built on Tahiti, one of the Society Island group, by the French government. The temporary station is of 10 kw. capacity, and will be used until the permanent station is completed. The latter will have an aerial system supported by eight towers, each 325 feet high, placed in two parallel rows of four towers each. Two antennæ will be provided for two different wave lengths. It is expected that the permanent installation will be capable of working with Sydney, South America, Honolulu, San Francisco, Cochin-China, and even Martinique and Guadeloupe. On January 5 the temporary station on Tahati was heard at San Francisco.—*Scientific American*, 5/2.

RADIO NEUTRALITY REGULATIONS.—Instructions issued by the Navy Department for the enforcement of President Wilson's neutrality proclamation regarding communication by radio, provide that all merchant vessels flying the flag of a belligerent country must, upon entering United States ports, lower the antennæ of radio installation to the deck and disconnect them from the radio station of the ship. The antennæ must remain lowered and disconnected and the receiving and transmitting apparatus remain sealed during the time the vessel remains within the limits of the port, unless repairs are necessary. Immediately before clearing, collectors are instructed to authorize the masters of vessels to hoist the antennæ and place the radio apparatus in condition for operation, so that on getting clear of the limits of the port the radio set may be available.—*Shipping Illustrated*, 15/1.

CANALS

SLIDES AT PANAMA.—As a supplement to its issue of January 5, the *Canal Record*, official organ of the Panama Canal Zone, publishes an article on "Slides at Panama," by Major General George W. Goethals, U. S. A., governor of the Panama Canal, which is copiously illustrated and which sets forth clearly the exact reasons for the occurrence and recurrence of the troublesome earth-slips which have operated for so many months to close the canal to commerce. He sums up the situation as follows: "As to the amounts involved, it is difficult to make any reliable estimate. The length of these slides, which are directly opposite each other, is approximately 2200 feet (the channel through which is navigable with the exception of 600 feet); the banks are 300 to 350 feet above sea level on the east and extend up to 480 feet above sea level on the west. The area of the territory affected on the east side covers 81 acres and on the west side 78.5 acres.

"Assuming that all material lying above planes extending from the outside limits of the bottom of the prism, reference 40, up to the limits of the breaks, will move into the cut, 7,000,000 cubic yards will have to be removed before the slides are entirely stopped. It is at best only a guess. It must not be inferred from this that the canal will be closed until this amount is dredged; on the contrary, it is the intention to pass ships as soon as a channel is secured through the remaining 600 feet, and there are reasonable grounds for assuming that a channel through the obstructed area can be maintained.

"It is certain that the troubles are due to the failure of underlying strata, because these were unable to bear the weight that the banks brought upon them. Under the circumstances it is difficult to understand the impression that has gained credence in some quarters that a sea-level canal would have avoided the difficulties encountered, since the cutting would have been through the same material, but at least 80 feet deeper.

"It is also certain that nothing can stop the movements now in progress until the angle of repose is reached for the materials under the conditions

that exist, and that this can be reached only by removing the excess amount of material. If experience counts for aught, then that gained in the handling of the slides and the breaks that have occurred along the line of the canal leaves no doubt that the means adopted and now in use will effect a cure in the slides that now close the canal; furthermore, that when cured no further troubles need be anticipated from slides in this locality."—*Army and Navy Journal*, 5/2.

NAVAL BASES FOR DEFENDING PANAMA.—Coincident with the news of the ratification by the Senate of the treaty with Nicaragua—under the terms of which we covenant to pay that country $3,000,000 in return for a perpetual right of way for the inter-oceanic canal, surveyed along the San Juan river and Lake Nicaragua, and a lease of Great Corn and Little Corn Islands and a naval base yet to be selected on the Nicaraguan coast of the Bay of Fonseca—comes word that Denmark is again anxious to sell us St. Thomas and her other West Indian possessions for a consideration of somewhat more that $4,000,000. The possession of these islands, in conjunction with our present bases at Guantanamo and Porto Rico and the projected naval base on the coast of Nicaragua, would prove of great value in defending the Panama Canal, just as the purchase by us of the perpetual right to build the only possible rival of the canal means that such a waterway will not be built—or, at least, not until the needs of commerce render it profitable to have two waterways across the neck of Central America. The fears of other Central American governments that our foothold in Nicaragua would menace their neutrality are recognized by the incorporation in the Nicaraguan treaty of a clause expressly stating that the rights of the other interested republics, Costa Rica, Salvador and Honduras, are not impaired by it. The proposition for the acquisition of the Danish West Indies may be traced back to the days immediately following the Civil War, when we first began to entertain some comprehension of our obligations to the south of us. It is interesting to remember, too, that Hayti, over which we have just assumed what amounts to a proctectorate, was near to occupying that position during General Grant's administration. Had the project then gone through, Hayti would now have been so much nearer civilization and millions of treasures and thousands of wasted human lives might have been saved.—*Army and Navy Journal*, 26/2.

MISCELLANEOUS

THE WAR'S NAVAL LESSONS FOR THE UNITED STATES. *By Frederick* PALMER.—Our first thought in preparedness, and our last, should be the navy. An efficient army at best can only stop an invader after he is ashore. An adequate navy will never allow him to land. Without naval protection, no force of ours, or of any enemy, can move over the seas. With no naval guns to escort them, transports are eggshells to the torpedo and the easy booty of the guns of a fast light cruiser.

Every square yard of our soil and every lock of the Panama Canal is safe while our fleet holds the seas that guard our coast. But a beaten navy means that the drawbridges of the Atlantic and Pacific are down and the road is clear for an enemy to work his sweet will with the Monroe Doctrine.

This is the overwhelmingly important lesson. I wish that I could bring it home to the United States as it was brought home to me when I saw the British grand fleet steam out into the North Sea offering the gage of battle to the Germans. It was a spectacle as convincing as addition and subtraction. The German submarines were busy at the time. They had sunk many British merchant ships. Yet British merchant ships still traversed the seas in every part of the globe. By its very nature, as this war has proved, the submarine must be a guerrilla, a highwayman.

The only purpose of a navy is to keep command of the sea. This command means freedom for the commerce under its flag. Commerce moves on the surface of the sea. We don't take a submarine when we go to Europe or send our wheat to Europe on a submarine. When gunfire has swept the seas clear of any enemy's ship that plies on the surface, there is nothing left for an enemy but underwater cruising. All he may show above the surface is a periscope—and that not for long. For speedy destroyers are watching for him, and hydroplanes are trailing his course to warn the destroyers of his location. He dare not face an open fight. He must hide in the sea as the highwayman hides in a cave by day before he goes forth by night to hold up the rich traveler. His part is that of an epidemic of burglary in a town. The burglars may cause a lot of annoyance to the police, they may take a good deal of booty, but the banks keep open and the traffic of the streets of the town go on as usual.

The British have twice as many submarines as the Germans, and German officers, who are not given to misjudging their enemy, do not regard them as inefficient. Yet we hear little of the exploits of British submarines. They have ranged the Mediterranean and the North Sea without finding any targets. In the Baltic they have accomplished something by forcing the German Navy to take the same precautions against them that the British had to take against German submarines. They have been to the harbor of Kiel only to find the German fleet protected by many mine fields and numerous nets.

The work of the British Navy is done on the surface of the sea because it commands the sea. If we command the sea in time of war, our submarines will be in the same situation as the British; they will lack targets. For east and west, north and south, the seas are clean of German ships which sail on the surface. Should one poke its head out of any harbor from pole to pole except in the Baltic, a British cruiser would go after it and run it down. No submarine could keep speed with that cruiser. It must wait by the roadside for the proposed victim of its torpedo to pass.

England gets her food supplies from the United States and Canada, and sends her factory products to her foreign markets the same as usual, while Germany is in siege—a sea siege. Nothing can enter into her portals, nothing come out, except past the British vessels on guard. Mysterious that British grand fleet, waiting in its unmentioned harbor. No daily bulletins of battle come from it as from the trenches on the continent. Its significance is in its silence. But every German soldier, every German man, woman, and child feels its power. That is the lesson to bear in mind. If there had been no British Navy, or if England had not gone into the war, the mighty struggle would have been over by now, most experts think, and Germany would have won. The balance of victory has hung from the beginning on sea power. We must never let any side issue draw us away from this main thought.

The Germans did not wait on this war to learn the value of sea power. They set out again to attain it by a carefully planned program of the same kind which produced their army system. From fifth place they went to fourth, then to third, and then to second, passing us. Their navy being shut up in a harbor does not mean that it has ceased to be a factor in the war. It has only to lift the nets and open the mine fields and sail out when it chooses. Intact, ready, it becomes a counter in any bargain for peace. The Kaiser can steam his dreadnoughts in line ahead on to the peace conference table as cards to be played in the negotiations. The smaller the world becomes, the closer the continents are drawn together by traffic over the seas, the more important sea power becomes. For us it must protect the Monroe Doctrine, Porto Rico, Hawaii, and the Philippines, if we choose to retain them.

Why doesn't the British fleet go after the German fleet? Because the British fleet cannot reach it. The British fleet has accomplished its main purpose while it keeps command of the sea.

Why does not the German fleet come out? For the same reason that the American fleet would not go out if we were at war with a power having a superior navy to ours. The German fleet has even given up sniping, except with its submarines, because in every kind of ship in these two homogeneous, well-organized fleets the British have numerical superiority. The Germans are outnumbered in destroyers, in light cruisers, in battle cruisers, in battleships.

There is no weak spot in the armor on either side. They have built thoroughgoing, complete navies as far as they have gone. If the British had been weak in any one department, as we are in battle cruisers and in number of personnel, they would soon have heard from the Germans in the same way that the allied armies, which were weak in heavy artillery, heard from them. The moral, whether your navy is large or small, is not to make it a one-sided navy—all submarines or all battleships. Have an all-around plant, though it is small, and have it sufficiently manned.

Dreadnoughts must not only have the most expert service, but there must be enough of these experts. We must not run out of these skilled mechanics in time of war. Ships without men are as helpless as men without ships. England's realization of this has not been the least of the contributing factors in her retention of the command of the sea. Her best, most seasoned men are on her battleships. The average man on a British dreadnought has had four years' service, on ours two. Both England and Germany have big reserves of men ready to be called into service in time of war. We have not. We have not even enough men on active service to do the navy's work. We have to lay ships up for the want of men to man them.

The battleships of the Atlantic fleet are short some 5000 men, and the total shortage in all vessels of the fleet is about 8000 men. Destroyers and reserve battleships are kept in harbor for want of men. It does not mean that we have enough when the total force allowed by Congress is enlisted. The new five-year program proposed by Secretary Daniels calls for 10,000 additional men, but the ships themselves will require 30,000 more if we are to bring the number of our personnel up to the European standard.

And what of officers? The men come and go, but the commissioned officers make the navy a permanent profession, no less than a lawyer makes the law or an engineer engineering or a physician the practice of medicine. No profession is more exacting in the knowledge required or in the study necessary to keep up to date. They begin at their profession young, the very day as boys they enter Annapolis; they keep hard at it. Naval officers can no more be improvised on short notice in time of war than surgeons or lawyers.

As the British navy has a long-term enlistment and we have a short, there is the more reason why we should have ample officers. We need them to train the recruits. Where our dreadnought, the *Delaware,* has 35 officers, a ship of the same class, the *Bellerophon,* of the British Navy has 53, and the *Helgoland* of the German Navy has 54. Secretary Daniel's five-year building program provides for 250 officers, when the full complement would be 1700.

When war begins we shall want to put into commission immediately every naval vessel which we have in reserve. Where are we to find them men? Britain and Germany have them ready. We have not. Where are we to find the officers to take charge not only of the regular naval vessels in reserve, but all the auxiliaries which would be called into service, whether trawlers or improvised mine layers? All this work is highly technical. Its oversight in every instance will require an expert if any efficient results are to be expected. If you know how to walk, you possess one of the requirements of infantry; but before you can direct any kind of a naval operation you must at least know how to handle a ship.

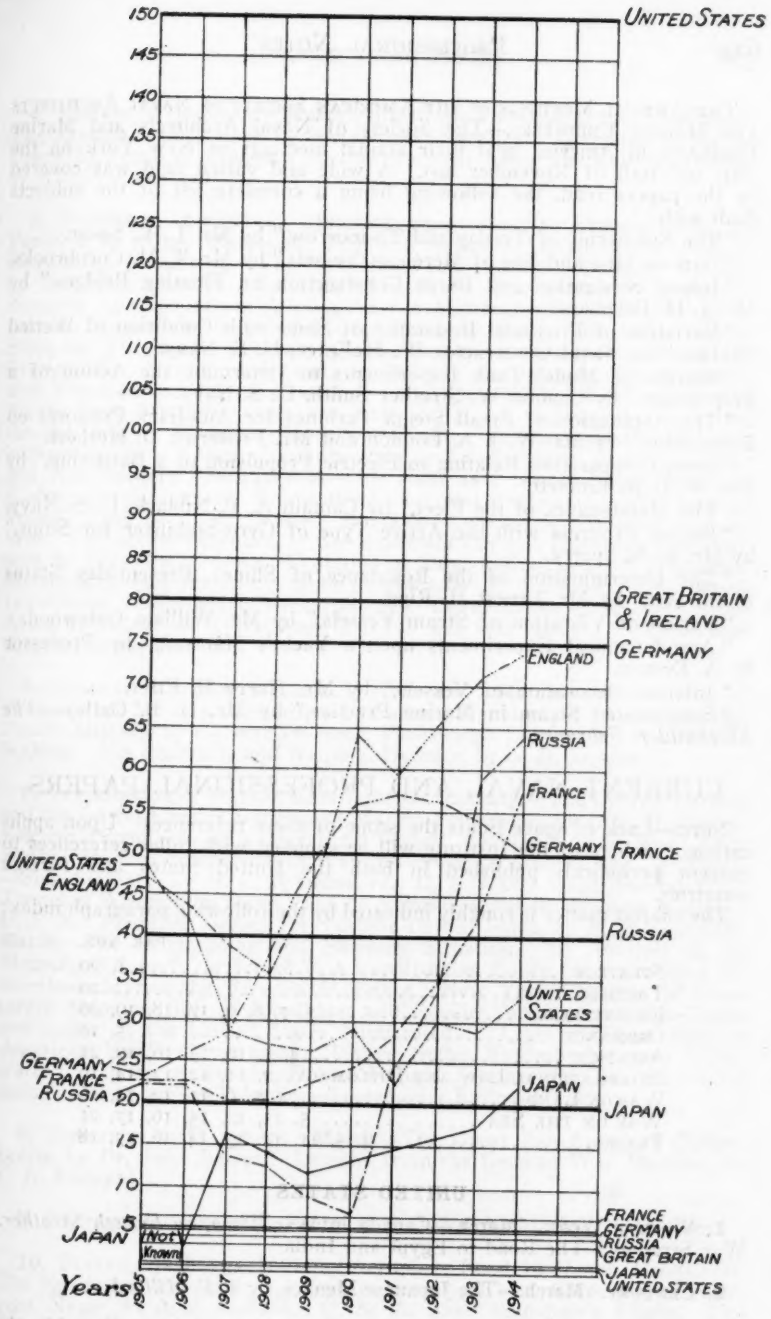
Whatever success the Germans had with their submarines was due largely to their having such large numbers of highly trained officers; and the success of the British in holding off the submarines was due to abundant professional skill which understood naval requirements and methods and how to use the material. Let us have men enough for our navy. Certainly they form no threat of militarism by building up a large class engaged in the calling of arms. For naval power in the long run is expressed in machinery and expert handling by small numbers of skilled men.

Along that western front, where vast armies are engaged, thousands of men have been killed and wounded. The daily toll of death, both on the German and the allied side, is staggering. A great belt of France, from the British Channel to Switzerland, is in ruins as the price of the defence of France by land. But no British dreadnought except the *Queen Elizabeth* has fired a shot. All the naval fighting has been done by the battle cruisers and smaller craft. No one has been wounded on a dreadnought. By the fact of demonstrated superior numbers and power the British fleet has held the enemy behind Heligoland. In England there are no belts of ruins.

Our situation is like England's in that we have the sea between us and any enemy. There you have the greatest of all the lessons of European war for our country. It is better to stop the invader from landing than to have a bloody line of trenches from Vermont to South Carolina.—*N. Y. Times.*

GUAM'S WEAKNESS.—Several bits of information that may not be altogether without significance are contained in the pages of the official report of Captain William J. Maxwell, U. S. Navy, Governor of Guam, concerning our little known and less appreciated, island dependency. On November 3, 1914, the Japanese battleship *Katori* cruised around the island at from three to eight miles distance offshore, taking a good look at the lay of the land and probably enjoying the utter lack of defensive measures—we have spent $13,228.88 for ordnance and ordnance stores up to this time on Guam. She displayed her colors and radioed her call-letters only when within the three-mile limit of the line drawn between the headlands. On November 8 the Japanese merchantman *Nippon Maru* persisted in entering the harbor of Apia, after having been met outside and warned off by a boarding officer. Explanations of her conduct being unsatisfactory her master was ordered to depart—which he did the next morning, probably after he had found out whatever he was sent to discover. Several lines below this, Captain Maxwell remarks that the marine garrison of the island was outnumbered 12 per cent by the 33 officers and 340 men of the crew of the German gunboat Cormoran, who were interned on December 15, 1914. Later, on December 30, 1914, two Japanese hydrographic engineers arrived for the purpose of determining the correct longitude of Tokio. They remained until February 5, 1915, and, of course, any additional information the Japanese Government may have wished about Guam was readily obtained by them.—*Army and Navy Journal*, 5/2.

WEAKNESS INVITES WAR.—Mr. Straus said that he had an opportunity as Ambassador to Turkey to observe diplomatists and their work. "In all grave and important diplomatic issues between nations," he said, "I discovered that the stronger nation won and the weaker nation lost. Armies and navies when not actually engaged in war have a great use—namely, they stand behind the diplomacy of a nation. Their power is of the greatest value known for preserving peace and for allowing matters otherwise grave to pass through diplomatic channels. Preparedness and power are the greatest peacemakers I know. Weakness of a country as productive as this one, is but an invitation to war."—*N. Y. Herald*, 1/3.



Curves of Annual Naval Expenditures for New Construction Only (in millions of dollars).

Heavy Horizontal Lines Indicate Wealth of Nations in Billions of Dollars (1913).

Light Horizontal Lines Indicate Indebtedness of Nations in Billions of Dollars (1912-1913).

THE ANNUAL MEETINGS OF THE AMERICAN SOCIETY OF NAVAL ARCHITECTS AND MARINE ENGINEERS.—The Society of Naval Architects and Marine Engineers in America held their annual meetings in New York on the 18th and 19th of November last. A wide and varied field was covered by the papers read, the following being a complete list of the subjects dealt with:

"The Submarine of To-day and To-morrow," by Mr. L. Y. Spear.

"Data on Hog and Sag of Merchant Vessels," by Mr. T. M. Cornbrooks.

"Inland Navigation and Barge Construction *vs.* Floating Bridges," by Mr. J. H. Bernhard.

"Variation of Frictional Resistance of Ships with Condition of Wetted Surface," by Naval Constructor W. McEntee, U. S. Navy.

"Results of Model Tank Experiments to Determine the Action of a Ship Brake," by Captain W. Strother Smith, U. S. Navy.

"The Application of Small Steam Turbines for Auxiliary Purposes on Board Ship," by Mr. W. J. A. London and Mr. Frederick D. Herbert.

"Some Comparisons Relating to Electric Propulsion of a Battleship," by Mr. W. L. R. Emmett.

"The Maintenance of the Fleet," by Captain A. P. Niblack, U. S. Navy.

"Recent Progress with the Active Type of Gyro-Stabilizer for Ships," by Mr. E. A. Sperry.

"The Determination of the Resistance of Ships: Present-day Status of the Art," by Mr. Ernest H. Rigg.

"Period of Vibration of Steam Vessels," by Mr. William Gatewood.

"Aerodynamical Experiments upon a Yacht's Mainsail," by Professor H. A. Everett.

"Interior Decoration of Vessels," by Mr. Harry B. Etter.

"Superheated Steam in Marine Practice," by Mr. H. B. Oatley.—*The Shipbuilder, February.*

CURRENT NAVAL AND PROFESSIONAL PAPERS

NOTE.—Lack of space limits the scope of these references. Upon application, members of the Institute will be supplied with fuller references to current periodicals published in both the United States and foreign countries.

The subject matter is roughly indicated by the following paragraph index:

	PAR. NOS.
STRATEGY	1, 20
TACTICS	20
ENGINEERING	5, 7, 8, 9, 17, 18, 19, 20
ORDNANCE	5, 18
AVIATION	4, 5, 10, 15, 16, 19, 21
INTERNATIONAL LAW AND DIPLOMACY	2, 11, 12, 13, 14, 16
WAR ON LAND	4, 5, 6, 11, 12, 14, 16
WAR ON THE SEA	5, 11, 12, 15, 16, 17, 21
TRADE	1, 3, 4, 5, 11, 12, 13, 14, 16, 17, 18

UNITED STATES

1. WORLD'S WORK. **March.**—Canada in War Time, by *French Strother.* War Strategy: The Road to Egypt and India.

2. CENTURY. **March.**—The Japanese Menace, by *T. F. Millard.*

3. ATLANTIC MONTHLY. **March.**—Business after the War, by *Ray Morris.* A Soldier of the Legion, by *E. Morlae.*

4. REVIEW OF REVIEWS. **March.**—Bankrupt Diplomacy, by *Elihu Root.* The Aeroplane of To-day, by *Waldemar Kaempffert.* Campaign as Spring Opens, by *Frank H. Simonds.* Preparedness of Army Medical Department, by *Alton G. Grinnell.*

5. SCIENTIFIC AMERICAN. **January 15.**—Industrial Preparedness for Peace, I, by *Miner Chapman.* Progress in Radio Telephony, by *John L. Hogan, Jr.* **January 29.**—The U. S. Naval Engineering Experiment Station, by *Wm. L. DeBaufre.* Searchlights in War. Our Merchant Marine, I. Zeppelin Airships (from *Jahrbuch der Schiffbautechnische Gesellschaft*). German Commercial Preparedness for Peace, by *James Armstrong.* Supply Ships for The Navy. **February 5.**—Keeping an Army Supplied, by *Alfred Gradenwitz.* New Developments in Military Aeroplanes. Naval Militia and Preparedness, by *Lieutenant W. J. Willis, N. M. N. Y.* Throwing Bombs from Airships. Grenades, Rifle and Hand. **February 12.**—Feeling through Fog by Wireless. Munitions Profits. **February 19.**—Cooperation in Foreign Trade. Aiming with the Rifle, by *Edwin Edser.* Modern Science and War Surgery. **February 26**—Our Navy as a School House, by *E. K. Roden.* Explosives, by *Frank Bailey.* Aerial Torpedoes. Problems of Storing Coal, by *C. E. Lesher.* **March 4.**—Commercial America and the War. The Screw Propeller, by *Sir Archibald Denny.* Economic Preparedness, by *Franklin K. Lane.* Evolution in Shipbuilding, by *A. C. Holzapfel.* Signaling Among the Ancients, by *Commander H. N. Shore, R. N.* **March 11.**—Ocean Temperatures near Icebergs. Development of Military Small Arms, by *Colonel O. B. Mitcham,* U. S. N. The War Game, I, by *Lieutenant G. von Horvath.*

6. JOURNAL MILITARY SERVICE INSTITUTION. **March-April.**—A Logical Program for Military Legislature, by *Captain Stockton.* A Review of West Point's History, by *Colonel Tillman.* Plattsburgh Lessons, by *F. C. Frothingham.* The Railroads and National Defence, by *G. D. Snyder.*

7. INTERNATIONAL MARINE ENGINEERING. **January.**—The Geared Turbine and the Turbo Electric Systems of Marine Propulsion, by *J. H. Macalpine.* Electric Propulsion of a Merchant Vessel. Shipbuilding in the United States. Modern Submarines in War and Peace, by *Simon Lake.* **February.**—Ship Stability, by *H. L. Whittemore.* U. S. Naval Experimental Wind Tunnel at Washington Navy Yard, by *Naval Constructor William McEntee, U. S. N.* Propeller Design for Turbine-Driven Ships, by *N. A. Graveson.* **March.**—The Shipbuilding and Shipping Situation. An Analysis of the Shipping Bill, by *"Old Scotch."* A Constructive Policy for Upbuilding the Merchant Marine, by *Bernard N. Baker.* New York Chamber of Commerce Shipping Bill. Shipbuilding and Repair Yards on the Sea-Coasts and Lakes of the United States (illustrated). Types of Ships Built in American Yards (illustrated). United States Battleship *Nevada* (illustrated). Trials of Turbine-Driven Freight Steamer *Pacific.* Successful Installation of a Fire-Tube Superheater on a Railroad Tug.

8. ENGINEERING MAGAZINE. **March.**—The Great Pan-American Opportunity, by *Dr. John Barrett.* Lessons from the German War Machine, by *C. E. Knoeppel.*

9. SHIPPING ILLUSTRATED. **February 19.**—Skandia Marine Oil Engines.

10. FLYING. **January.**—National Aeroplane Fund, by *Henry Woodhouse.* The Ethics and Economics of Preparedness, by *Henry Woodhouse.* Newport News Aviation Section. U. S. A. Aero Squadron's Flight. The Sturtevant Battleplane. **March.**—Post Office Department Invites Proposals for Carrying Mails by Aeroplane, by *Henry Woodhouse.* The Fifteen Ton Curtiss Air Cruiser, by *Henry Woodhouse.* Directing Relief Work by

Aeroplane during the Recent San Diego Flood. The Aero Coast Patrol, by *Rear Admiral Robert E. Peary*. Ten Thousand Aeroplanes to Protect the Monroe Doctrine.

GREAT BRITAIN

11. THE NINETEENTH CENTURY AND AFTER. **January.**—The Only Way to Lasting Peace, by *Dr. Arthur Shadwell*. Germany's Food Problem and its "Kontrolle," by *John Hilton*. The Sacrifice of Serbia, by *Robert Machray*. Behind the French Lines: Impressions of Champaigne and Lorraine in War Time, by *Percy Hurd*. Current Theories of Democracy: an Analysis of Truths and Errors, by *W. H. Mallock*. The Integrity of the Empire: the Offer of Cyprus to Greece, by *Sir Francis Piggott (late Chief Justice of Hong Kong)*. **February.**—The Pact of Konopisht: Kaiser and Archduke, June 12, 1914, by *Henry Wickham Steed*. Victory and the Alternative, by *Dr. Arthur Shadwell*. The Monroe Doctrine and the Great War, by *Moreton Frewen*. The General Staff, by *General Sir O'Moore Creagh, V. C., G. C. B., G. C. S. I. (late commander-in-chief in India)*. British Merchant Sailors under War Conditions, by *W. H. Renwick*.

12. THE FORTNIGHTLY REVIEW. **January.**—Our Nearest and Dearest Enemies, by *Dr. E. J. Dillon*. British Commerce in War-Time: The Abuse of Sea-Power, by *Archibald Hurd*. Denmark and the Great War (with map), by *Geoffrey Pyke*. Five Months on the Italian Front, by *Julius M. Price*. Economics and War, I, by *J. A. R. Marriott*. A Winter Campaign in Armenia, by *G. M. Chesney*. M. Briand's Cabinet and its Problems, by *Charles Dawbarn*. President Wilson and His Message, by *James Davenport Whelpley*. Action and Reaction in the Far East, by *E. Bruce Mitford*. History of the War (with maps). **February.**—The Fruits of Amateurism, by *Dr. E. J. Dillon*. The House and the Pledge, by *Auditor Tantum*. Anglo-Swedish Opposition: a Letter from Stockholm, by *Robert Crozier Long*. Secrets of the Admiralty, I, by *Archibald Hurd*. The New Orientation of History, by *Sidney Low*. The Fall of Belgrade, by a *Serbian Officer*. The Secretary for the Colonies, by *Scriptor*. How President Yuan Became Emperor, by *Francis Aldridge*. The Italian Sphinx, by *Berto Tasso Tassinari*. The Germans in Persia, by *Robert Machray*. The Evacuation of Gallipoli, by *Sydney A. Moseley*. The War in Washington, by *James Davenport Whelpley*.

13. THE CONTEMPORARY REVIEW. **January.**—The Balkan Question, by *Sir Edwin Pears*. Italy and the Triple Entente, by *Dr. E. J. Dillon*. Seven Postulates of International Law, by *Sir John MacDonell*. The Hohenzollerns and the German National Character. The White Man in Asia, by *Sir Thomas Holdich*. **February.**—Military Compulsion (both sides). Democratic Control of Foreign Policy, by *Gilbert Murray*. Some of Russia's Difficulties, by *Dr. S. J. Dillon*. Philhellenism in England and France, by *Roland Burrows*.

14. THE QUARTERLY REVIEW. **January.**—Why Canada is at War, by a *Canadian*. An Economic Stocktaking, by *H. J. Jennings*. South Africa and Her German Neighbor, by *R. C. Hawkin*. War Relief and War Service, by *Mrs. Fawcett*. German Methods of Penetration in Belgium, by *Henri Davignon*. The Censorship and its Effects in England and America. British Diplomacy and the Near East. The Course of the War, by *Colonel W. P. Blood*. The British Government and War. The Danish Agreement and the Feeding of Germany.

15. UNITED SERVICE MAGAZINE. **January.**—The Navy and the War, by *"Admiral."* The Specialist and the Navy. A German Corsair, by *Hector C. Bywater*. Naval History and Efficiency. The Levant, December, 1915, by *T. Miller Maguire, LL. D.* "The Noise of Countless Wars," by *Colonel A. C. Yate*. Progress in Aeronautics, by *Major H. Bannerman-Phillips*.

16. LAND AND WATER. **January 29.**—Capturing German Trade, by *Arthur Kitson.* Control of the Levant, by *Hilaire Belloc.* Naval Diplomacy, by *Arthur Pollen.* **February 3.**—Common Sense about Monte Negro, by *Alfred Stead.* **February 17.**—Roumania's Decision, by *Alfred Stead.* True and False Impressions of the War, by *Hilaire Belloc.* British Aeroplane Policy, by *F. W. Lanchester.* Some Lessons from the American Civil War, by *John Buchan.* War and the Bankers, by *Arthur Kitson.*

17. THE SHIPBUILDER. **January.**—Shipbuilding in 1915 and 1916. Shipbuilding Developments in the United States. The Growth and Present Position of Shipbuilding in Japan, by *E. R. Thompson.* Shipbuilding in Scandinavia during 1915. Shipbuilding in Holland during 1915. New Shipbuilding and Marine Engineering Contracts. **February.**—The Submarine of To-day and To-morrow, by *Mr. L. Y. Spear.* Variation of Frictional Resistance of Ships with Condition of Wetted Surface, by *Naval Constructor William McEntee, U.S.N.* Results of Model Tank Experiments to Determine the Action of a Ship Brake, by *Captain W. Strother Smith, U.S.N.* The Application of Small Steam Turbines for Auxiliary Purposes on Board Ship. The Merchant Navy in War Time, by *Mr. W. S. Abell.*

18. ENGINEER. **February 4.**—Warship Design and the Present War. The World's Shipbuilding in 1915. Resistance in a Seaway. The Baghdad Railway. **February 18.**—The Manufacture of High-Explosive Shells in France. On the Theory of Multiple Evaporators. Commercial Conditions in Japan.

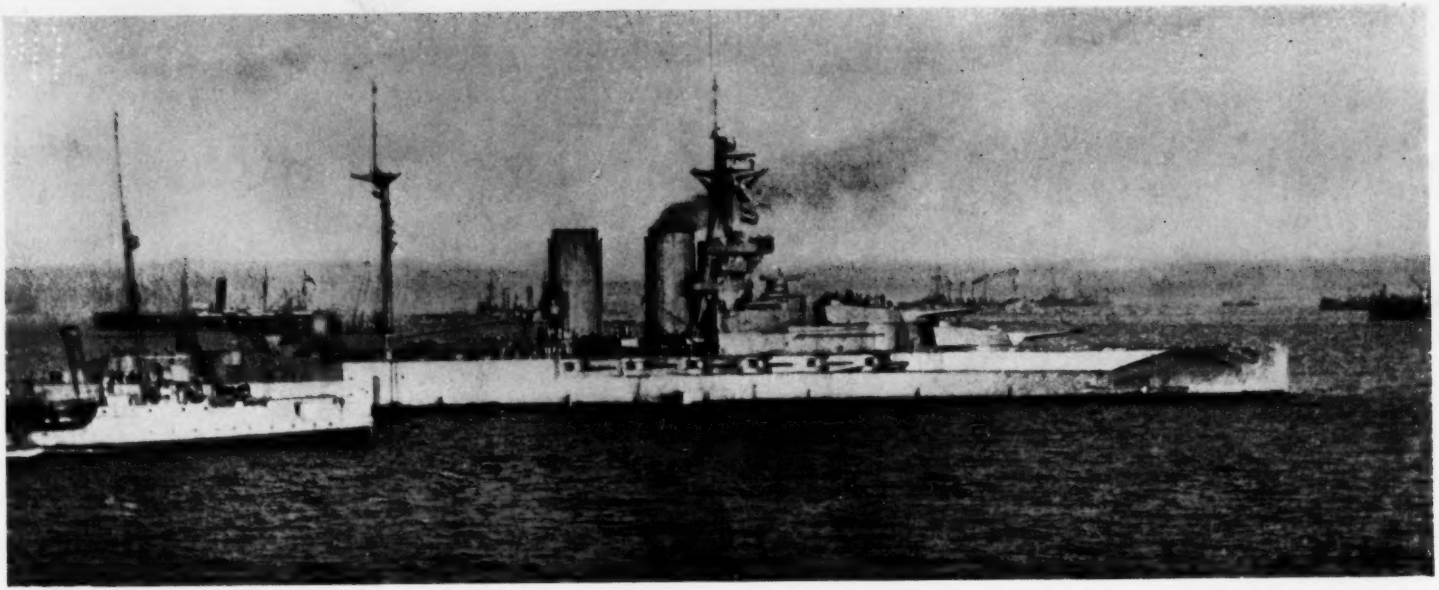
19. ENGINEERING. **January 14.**—Stable Biplane Arrangements. **February 18.**—Nomenclature of Internal Combustion Engines. Spanish Destroyers of *Bustamante* Class (illustrated).

SPAIN

20. REVISTA GENERAL DE MARINA (Madrid). **December.**—Submarine Propulsion. **January.**—The Battle of Trafalgar (Spanish documents). Theory of the Gyroscope.

SOUTH AMERICA

21. REVISTA DE MARINA (Chile). **December.**—Points on Navigation. Aeronautics. Naval Actions, 1914-15: A Review.



N. Y. Times.

H. M. S. "QUEEN ELIZABETH," LARGEST OF BRITISH DREADNOUGHTS, AND THE ALLIED FRENCH AND BRITISH FLEETS IN THE DARDANELLES READY TO COVER LANDING FORCES

"In order to reduce the wear on her guns caused by erosion which is the greater the greater the caliber of guns, and in order to produce a large angle of fall on shore in attack on the fortifications at the Dardanelles, the battleship *Queen Elizabeth* used but three of the four sections of the charges for her 15-inch guns in her work there."

(This picture shows location of stacks, control stations, range finder and intermediate guns)

EUROPEAN WAR NOTES

Compiled by LIEUTENANT C. C. GILL, U. S. Navy *

GENERAL ARRANGEMENT

PAGE

1. DIPLOMATIC NOTES 629
2. NAVAL NOTES 642
3. MISCELLANEOUS NOTES 675

(Details of Land Operations are not included.)

[Events of international significance will be briefly chronicled in large type. Notes and comments bearing upon these events will be interspersed in smaller type. Addenda will be published in future issues to correct and complete this compilation.]

DIPLOMATIC NOTES

GREAT BRITAIN AND UNITED STATES

In answer to agitation for more stringent blockade measures, Sir Edward Grey, on **January 26**, defended the government policy in Parliament. He pointed out: (1) That figures of exports from the United States do not indicate the amount of goods actually reaching their destination, since large quantities are stopped by the blockade. (2) The blockade cannot interfere with vessels "destined for neutral ports with *bona fide* neutral cargo." (3) "We are applying the doctrine of continuous voyage." (4) An actual blockade would differ from the present only by confiscation instead of payment for cargoes.

CRITICISM OF BLOCKADE.—In the British House of Lords on February 22 the matter of a stricter blockade of Germany was discussed at great length. Lord Beresford in his remarks demanding a more thorough blockade said, in part: "A war was never won by orders in council or proclamations, but by hard hitting. If we want to bring Germany to her knees we must exercise the blockade power thoroughly and completely under the principles of international law. To do that it is necessary to have a policy and to turn it over to the navy and let the navy enforce it. These orders in council may

* Acknowledgment is made to A. F. Westcott, Ph. D., Instructor U. S. Naval Academy, for help given in making this compilation.

sections of the charges for her 15-inch guns in her work there.
(This picture shows location of stacks, control stations, range finder and intermediate guns)

be statesmanship, but they are not war, and they are not likely to win the war. I would allow nothing whatever to go into Germany, not even luxuries. I would abolish the distinction between absolute and conditional contraband. I would extend the doctrine of continuous voyage to all contraband. The war should be run by five cabinet ministers without departmental duties. The longer we have civilian control of the operations of the war the more disasters we shall suffer."

ORDER IN COUNCIL VERSUS BLOCKADE.—The argument in favor of proceeding by blockade is twofold. The neutrals question the validity of the order in council. The legality of a blockade seems easier of establishment. If the validity of the blockade can be legally maintained, the blockading powers have the right to confiscate not contraband goods only, but both goods and the ships carrying them when they attempt to break through the blockade. It is then a more efficient process. If the supplies entering Germany have to be carried by ships that must insure against the risks the blockade runner has to face, two results would follow. Only a very small proportion of ship owners would face the risk, and supplies would not only automatically become less in bulk, but enormously more costly. It might be thought, if the United States has protested so vigorously against our proceedings in the matter of contraband, that they would protest still more vigorously if we adopted the infinitely more drastic measure of blockade. If the hanging up of American ships seemed a hardship would not the confiscation or destruction of the chartered ships seem intolerable? As to this we have something to guide us in the character of the Notes which the United States have addressed to the German Government. Omitting the case of the *William P. Frye,* a grain ship destroyed by a German cruiser after the cargo had been removed, there is not amongst Mr. Wilson's published notes to Germany a single word of protest against the destruction —without legal trial or any prize court procedure—of a single capture made by the Germans, either by surface ships or by submarines. So far as we know the whole of the Washington-Berlin correspondence is concerned with the inhumanity and injustice only of the German proceedings. Indeed, there seems no other interpretation that can be put upon the third *Lusitania* note, than that Mr. Wilson accepts, as a necessary development of modern naval war, that prizes should be destroyed on the high seas. He is only concerned that if this destruction is carried out by submarines, the safety of the non-combatant passengers and crews should be properly secured. If then a plausible legal argument can be made out for the blockade, it is unlikely that the Americans, having waived the right to trial, will raise against our proceedings objections they have not raised against Germany's.—*Land and Water.*

DEFENCE OF ORDERS IN COUNCIL. *Sir Edward Grey's Speech.*—The Russian press, which inveighs at the ineffectiveness of the blockade, does not seem to realize that, during the long Arctic winter which closes navigation in the White Sea, intercourse between Russia and the Allies depends entirely on Sweden. Simple measures of retaliation on the part of Sweden might arrest such intercourse, which is of primary importance. Moreover, France and England receive many useful imports from Sweden, and could ill afford to lose her trade. . . . . As for the United States, her position differs notably from that of the Scandinavian states and Holland. She cannot advance the arguments employed by these powers. The Allies have thus far been content to confiscate only indisputable contraband and to sequestrate suspected merchandise with provision for indemnity. The injury to American commerce is thus reduced to a minimum. In short, the United States is reaping immense profits from the war, and her government would be unwise to leave the field of platonic protestations.—*Journal des Débats,* 28/1.

FIGURES OF U. S. FOREIGN TRADE

IMPORT AND EXPORT TRADE WITH GERMANY

	1913	1914	1915
Imports	£30,336,454	£25,757,651	£8,194,537
Exports	54,129,494	31,211,761	2,357,561

PRINCIPAL EXPORTS

	1913	1914	1915
Raw cotton	£22,411,418	£13,634,643	£2,135,784
Maize	710,527	16,393	2,950
Automobiles	155,093	159,910	560
Fertilizers	940,221	373,287	1,490
Bacon	27,205	2,959	6,350
Lard Compounds	4,860	2,175	3,920

—*London Times*, 24/1.

TOTAL EXPORT TRADE (IN MILLIONS)

	1913	1914	1915
Europe	1,176	1,004	2,077
South America	124	80	116
Central America	76	59	62
Asia	100	77	115
Canada	346	268	276

—*Journal des Débats*, 25/1.

1812 AND 1915.—A very curious fact is that our shipments of foreign merchandise, imported first and then reexported, rose for the first time in our history above our similar exports in the Napoleonic wars. Until last year, the highest annual total of "foreign merchandise reexported" was the $60,283,000 of 1806—a result of the huge trade with Europe in West Indian merchandise, conducted by the neutral American merchant fleet when French and English merchant ships were subject to capture by the enemy frigates.

Never afterward, between 1807 and 1914, did the total come within 60 per cent of the Napoleonic maximum. Even in 1914 it was only $42,500,000, but last year it reached $61,464,000. It is not without interest to recall that, whereas in 1806 the foreign merchandise amounted to 50 per cent of our total exports, in 1915 the proportion was only 1¾ per cent. Europe's purchases of our own domestic products increased surprisingly little during the war period of a century ago; the present war has had a very different story to tell in that regard.

One other aspect of these detailed trade returns is of political interest. Last year's exports to Germany and Austria decreased $158,000,000; but our exports to Holland, Denmark, Norway, and Sweden—countries with commercial access to Germany—increased $154,800,000 over 1914, and $182,800,000 over 1913, a normal year of peace. These figures are the basis of England's effort to restrain exports to the above-named neutral countries, except when guaranteed against reexport to Germany.

Bearing on yet another problem, our exports last year to South America were $54,300,000 greater than in 1914. They were still a million dollars under 1913, though exceeding all other years. But exports to Asia, Africa, and Australasia surpassed by $42,000,000 the largest previous yearly total. This clearly reflects the reversion to the United States of trade with neutral consuming nations, previously in the hands of Germany and England, but partly or wholly lost by them because of the European war.—*N. Y. Nation*, 24/2.

ALLIES' PLEDGE TO BELGIUM.—On February 14 the Allies' ambassadors presented the Belgian Foreign Office with the following statement:

The allied powers signatory to the treaties guaranteeing the independence and neutrality of Belgium have decided to renew to-day by solemn act the agreements made regarding your country, which has been heroically faithful to its international obligations. Consequently we, the Ministers of France, Great Britain, and Russia, duly authorized by our governments, have the honor to make the following declaration:

The allied and guaranteeing powers declare that when the moment comes the Belgian Government will be called upon to take part in peace negotiations, and they will not put an end to hostilities without Belgium having re-established its political and economic independence.

The Italian minister told Baron Beyens that, although Italy was not among the powers which guaranteed the independence and neutrality of Belgium, he had no objections to the foregoing declaration. A similar announcement was made on behalf of the Japanese Government.

PROTESTS MAIL SEIZURES.—On January 4 Secretary Lansing lodged with the British Foreign Office a protest against seizure of American mails in transit to neutral ports, and on January 25 a protest against the British "Trading with the Enemies" act. Sweden, on February 17, requested the cooperation of the United States to prevent seizure of parcels post from this country to Sweden, and censoring of first-class mail. Secretary Lansing, on February 21, despatched a second note to Great Britain requesting a prompt reply to previous protests.

LOSS OF "MALOJA" AND "LA PROVENCE."—The sinking, presumably by mines, of 10 or a dozen ships in the last few days is regarded by the British press as evidence that, by some means, probably by the use of neutral vessels, new mine fields have been sown by the Germans in the North Sea and the English Channel. The most serious disaster was that which occurred on Sunday to the P. and O. liner *Maloja,* which struck a mine and sank within half an hour two miles off Dover. An official statement issued by the owners of the line on Monday gave the number of missing at 155, which included 49 passengers. The only American known to have been on board was saved. On Tuesday official announcement was made by the French Minister of Marine of the sinking last Saturday in the Mediterranean of the auxiliary transport *La Provence,* with a loss of more than 3000 lives.—*N. Y. Nation,* 2/3.

GERMANY AND UNITED STATES

DUTCH LINER SUNK.—The Holland-Lloyd passenger steamer *Tubantia* (15,000 tons) was sunk early on March 16 off the Northhinder lightship. The steamer was bound from Amsterdam for the River Platte with 381 persons on board, of whom all but four were saved.

Second Engineer De Groot, of the *Tubantia,* now makes the statement that an hour and a half after leaving the ship he saw a submarine of foreign build.

The Netherlands Ministry of Marine does not declare definitely that the *Tubantia* was torpedoed, but from all evidence in his possession regards it as extremely probable. J. J. Rambonnet, Minister of Marine, to-day confirmed a report to The Associated Press that an affidavit had been made by the first mate, the fourth mate and the lookout, in which they said they saw a white streak, which is only explainable as the track of a torpedo approaching the ship. When the streak touched the *Tubantia* an explosion followed. The *Tubantia,* according to the affidavit, had all but stopped when the explosion occurred. The vessel was hit amidship, aft on the starboard side two meters below the water-line. In view of all of this evidence, Minister Rambonnet declared that the only conclusion left was that

the *Tubantia* was torpedoed. "In fact," he said, "I regard it as ninety-nine out of a hundred chances that she was torpedoed."

The *Vaderland*, a Dutch paper, asks if the time has not come for America, Holland, Argentina, Brazil, Chile, Sweden, Norway, and Denmark to take combined action, "as their interests coincided and there can be no doubt concerning their sentiments. The South American republics are interested," it continues, "because the loss of the *Tubantia* deprives them of one of the few remaining links with Europe. The *Vaderland* believes that joint diplomatic pressure would convince Germany that the present method of submarine warfare must be abandoned."—*N. Y. Times*, 19/3.

By the middle of February it was understood that Germany had virtually acceded to the demands made by the United States in the *Lusitania* controversy—namely, disavowal, indemnity, and assurances against similar attacks in future; and that disagreement had been reduced to the substitution of "recognizes" for "assumes" liability. At this point the whole controversy over submarine warfare was reopened by notice from Austria **February 10**, and Germany **February 12**, that after **March 1** they would consider armed merchantmen as belligerents and torpedo them without warning. In spite of intimations to the contrary in Secretary Lansing's *modus vivendi* note of **January 18** to the allied powers proposing disarmament of merchantmen, the United States administration took a position opposing any change of international law by which vessels armed for defence only should lose their status as non-combatants, and refusing to withdraw its protection from American citizens sailing on vessels so armed. This policy was sustained by decisive votes in both houses of Congress. On **February 28** Ambassador Bernstorff stated that "no enemy merchantmen would be torpedoed unless the presence of armament on board was proved," and interpreted proof to mean actual resistance, thus bringing the German position again into accord with international law. According to the British Admiralty instructions to armed merchantmen (published **March 3**), emphasis is laid on the duty of avoiding combat, but the approach of aircraft or submarines is considered in itself evidence of hostile intention.

SECRETARY LANSING'S PROPOSALS OF JANUARY 18.—Secretary Lansing proposed the adoption of the following formula for the treatment of unarmed merchant ships:

First.—A non-combatant has the right to traverse the high seas in a merchant ship entitled to fly a belligerent flag, and rely upon the rules of international law and the principles of humanity if the vessel is approached by a belligerent war vessel.

Second.—A merchant vessel of any nationality should not be subject to attack without warning.

Third.—A belligerent armed merchant vessel should promptly obey any order from a belligerent warship to stop.

Fourth.—No such merchant vessel should be fired upon unless she tries to flee or to resist by force, and even in such a case any attack upon her by the warship must stop as soon as the flight or resistance ceases.

Fifth.—Only in case it should be impossible for military reasons for the warship to supply a prize crew or to convoy the merchant ship into port will she be justified in sinking such merchantmen, and in that case passengers and crew must be removed to a place of safety.

The concluding paragraph of Secretary Lansing's memorandum was as follows:

I should add that my government is impressed with the reasonableness of the argument that a merchant vessel carrying armament of any sort, in view of the character of the submarine warfare and the defensive weakness of underseas craft, should be held to be an auxiliary cruiser and so treated by a neutral as well as by a belligerent government, and is seriously considering instructing its officials accordingly.—*N. Y. Times,* 15/2.

GERMAN RENEWAL OF SUBMARINE WARFARE.—The German memorandum of February 12 closes as follows:

It is thus made plain that the armed English merchantmen have official instructions to attack the German submarines treacherously wherever they come near them, that is to say, orders to conduct relentless warfare against them. Since England's rules of maritime war are adopted by her allies without question, the proof must be taken as demonstrated in request of the armed merchantmen of the other enemy countries also.

In the circumstance set forth above, enemy merchantmen armed with guns no longer have any right to be considered as peaceable vessels of commerce. Therefore the German naval forces will receive orders within a short period, paying consideration to the interests of the neutrals, to treat such vessels as belligerents.

The German Government brings this status of affairs to the knowledge of the neutral powers in order that they may warn their peoples against continuing to intrust their persons or property to armed merchantmen of the powers at war with the German Empire.—*N. Y. Times,* 17/3.

INSTRUCTIONS TO AMBASSADOR BERNSTORFF, FEBRUARY 27.—*First.*—Germany will stand by the assurances she has previously given to the United States with respect to the future conduct of submarine warfare.

Second.—Germany does not regard its newly proclaimed policy of sinking armed merchant vessels on sight after February 29 as having nullified the assurances previously given.

Third.—Germany's interpretation of the assurances previously given that ships will not be attacked without warning is applicable only to unarmed merchant ships, and not as being broad enough to cover belligerent merchant vessels armed for defence, and which may use their armaments offensively against German submarines.

Fourth.—Germany regards the *Lusitania* case as embracing only the question of that government's attitude toward unarmed merchantmen and not as involving the question of the treatment of armed merchant ships.

Fifth.—Germany does not offer to suspend her proposed campaign of submarine attack without warning against armed merchantmen, and inferentially the campaign is to become effective on Tuesday, as planned.

Sixth.—Germany calls attention to the assurances given by the British Ambassador the first month of the war to the effect that guns on British merchantmen will never fire unless such vessels are fired upon first, and contends that these assurances have been violated by British armed ships, and by secret instructions issued by the British Government, and in support of this contention Germany offers what she regards as evidence enumerating vessels that have used their guns offensively against German

submarines and also copies of the alleged secret instructions to British merchant vessels.

Seventh.—Germany is willing to discuss with the United States the question of when defensive armament may be regarded as having become offensive.

Eighth.—Meanwhile Germany urges that Americans be warned not to travel on armed enemy merchantmen.—*N. Y. Times,* 28/2.

PROOF OF ARMAMENT.—The memorandum is silent regarding the manner in which the German submarine commanders are to obtain proof as to the presence of armament on board enemy merchantmen, but it is understood that Count von Bernstorff informed the Secretary of State that it was his opinion that German submarine commanders would regard the actual use of the guns on such merchantmen as the proof for which they must look before carrying out their instructions to sink armed belligerent merchantmen without warning.

Under this construction is would appear that, at least in the opening stages of the new campaign, German submarine commanders must have proof of the presence of guns on board enemy merchant ships before attacking them, and this proof must take the particular form of actual use of the guns of the merchantmen.—*N. Y. Times,* 28/2.

PRESIDENT WILSON'S STAND ON ARMED LINER ISSUE

On February 24 Senator Stone, Chairman of the Foreign Relations Committee, addressed to the President a letter expressing his unwillingness "to plunge this nation into the vortex of this world war because of the unreasonable obstinancy of any of the powers upon the one hand, or, on the other hand, of foolhardiness, amounting to a sort of moral treason against the Republic, of our people recklessly risking their lives on armed belligerent ships."

In reply, President Wilson addressed to Senator Stone the following letter:

THE WHITE HOUSE, WASHINGTON, February 24, 1916.

MY DEAR SENATOR.—I very warmly appreciate your kind and frank letter of to-day and feel that it calls for an equally frank reply.

You are right in assuming that I shall do everything in my power to keep the United States out of war. I think the country will feel no uneasiness about my course in that respect. Through many anxious months I have striven for that object, amidst difficulties more manifold than can have been apparent upon the surface, and so far I have succeeded. I do not doubt that I shall continue to succeed. The course which the Central European Powers have announced their intention of following in the future with regard to undersea warfare seems for the moment to threaten insuperable obstacles, but its apparent meaning is so manifestly inconsistent with explicit assurances recently given up by those powers with regard to their treatment of merchant vessels on the high seas that I must believe that explanations will presently ensue which will put a different aspect upon it. We have had no reason to question their good faith or their fidelity to their promises in the past, and I for one feel confident that we shall have none in the future.

But in any event our duty is clear. No nation, no group of nations, has the right while war is in progress to alter or disregard the principles which all nations have agreed upon in mitigation of the horrors and sufferings of war; and if the clear rights of American citizens should ever unhappily be abridged or denied by any such action we should, it seems to me, have in honor no choice as to what our own course should be.

For my own part, I cannot consent to any abridgment of the rights of American citizens in any respect. The honor and self-respect of the nation

is involved. We covet peace, and shall preserve it at any cost but the loss of honor. To forbid our people to exercise their rights for fear we might be called upon to vindicate them would be a deep humiliation indeed. It would be an implicit, all but an explicit, acquiescence in the violation of the rights of mankind everywhere, and of whatever nation or allegiance. It would be a deliberate abdication of our hitherto proud position as spokesmen, even amidst the turmoil of war, for the law and the right. It would make everything this government has attempted, and everything that it has achieved during this terrible struggle of nations meaningless and futile.

It is important to reflect that if in this instance we allowed expediency to take the place of principle, the door would inevitably be opened to still further concessions. Once accept a single abatement of right, and many other humiliations would certainly follow, and the whole fine fabric of international law might crumble under our hands piece by piece. What we are contending for in this matter is of the very essence of the things that have made America a sovereign nation. She cannot yield them without conceding her own impotency as a nation, and making virtual surrender of her independent position among the nations of the world.

I am speaking, my dear senator, in deep solemnity, without heat, with a clear consciousness of the high responsibilities of my office, and as your sincere and devoted friend. If we should unhappily differ, we shall differ as friends; but where issues so momentous as these are involved we must, just because we are friends, speak our minds without reservation.

Faithfully yours,

WOODROW WILSON.

GUNS ON ITALIAN LINERS.—The Italian passenger steamer *Verona* sailed from New York for Naples and Genoa, January 29, carrying her mounted 75-millimeter guns. Collector Malone received a telegram from the Secretary of the Navy early in the day instructing him to allow the *Verona* to clear with her guns. The *Verona* carries no passengers, but has 6000 tons of food supplies aboard and between 300 and 400 horses. Italy has given assurances to Washington that the guns mounted on the *Verona* are for defensive purposes only.—*Army and Navy Journal*, 2/5.

NEW YORK, March 1.

The *Giuseppe Verdi*, the largest and fastest of the Italian liners, left at 6.45 o'clock last night, carrying her two 3-inch rapid-fire guns on the stern with their gun crews. The ship carried 173 passengers. Two of those in the steerage were Italian-born American citizens.—*N. Y. Times*, 1/3.

FULL TEXT OF BRITISH INSTRUCTIONS TO ARMED LINERS

LONDON, March 2.

The British Admiralty to-night officially made public the Admiralty orders to armed merchantmen, given October 2, 1915.

The official statement reads as follows:

In view of the recent issue by the German Government of a memorandum on the treatment of armed merchant ships, the Admiralty has decided to make public the instructions actually governing the actions of British merchant vessels armed for self-defence:

Instruction, dated October 20, 1915, in re the status of armed merchant ships:

1. The right of the crew of a merchant vessel to forcibly resist visit and search and fight in self-defence is well recognized in international law and expressly admitted by the German prize regulations in an addendum issued June, 1914, at a time when it was known that numerous merchant vessels were being armed for self-defence.

2. Armament is supplied solely for the purpose of resisting attack by an armed enemy vessel and must not be used for any other purpose whatsoever.

3. An armed merchant vessel, therefore, must not in any circumstances interfere with or obstruct the free passage of other merchant vessels or fishing craft, whether these are friendly, neutral, or hostile.

4. The status of a British armed merchant vessel cannot be changed upon the high seas.

Rules to be observed in the exercise of the right of self-defence:

1. The master or officer in command is responsible for opening and ceasing fire.

2. Participation in armed resistance must be confined to persons acting under the orders of the master or the officer in command.

3. Before opening fire the British colors must be hoisted.

4. Fire must not be opened or continued from a vessel which has stopped, hauled down her flag, or otherwise indicated her intention to surrender.

5. The expression "armament" includes not only cannon, but also rifles and machine guns in cases where these have been supplied.

6. The ammunition used in rifles and machine guns must conform to Article XXIII, Hague Convention, 1907, that is, bullet must be cased in nickel or other hard substance and must not be split or cut in such a way as to cause them to expand or set up on striking a man. The use of explosive bullets is forbidden.

Circumstances under which aramment should be employed:

1. The armament is supplied for the purpose of defence only. The object of the master should be to avoid action whenever possible.

2. Experience has shown that hostile submarines and aircraft have frequently attacked merchant vessels without warning. It is important, therefore, that craft of this description should not be allowed to approach to short range, at which a torpedo or bomb launched without notice would almost certainly be effective. British and allied submarines and aircraft have orders not to approach merchant vessels. Consequently it may be presumed that any submarine or aircraft which deliberately approaches or pursues a merchant vessel does so with hostile intention. In such cases fire may be opened in self-defence in order to prevent the hostile craft from closing to a range at which resistance to a sudden attack with bomb or torpedo would be impossible.

3. An armed merchant vessel proceeding to render assistance to the crew of a vessel in distress must not seek action with any hostile craft, though if she herself is attacked while doing so fire may be opened in self-defence.

4. It should be remembered that the flag is no guide to nationality. German submarines and armed merchant vessels have frequently employed the British, Allied or neutral colors to approach undetected. Though, however, the use of disguise and false colors to escape capture is a legitimate ruse *de guerre*, its adoption by defensively armed merchant ships may easily lead to misconception. Such vessels, therefore, are forbidden to adopt any form of disguise which might cause them to be mistaken for neutral ships.

Admiralty comment:

These instructions, which are those at present in force, are the latest issued. Successive issues have been made, not by reason of a change in policy—the policy throughout has remained unaltered—but by improvement in wording and greater clearness of expression to emphasize the purely defensive character of the armament of merchant vessels.

It is because of the distorted interpretation given these instructions as a whole and the very forced character of the interpretation given by the German Government to portions which they quote from an earlier issue of the instructions that the Admiralty felt it desirable, with a view to allaying neutral anxiety, to publish these *in extenso*.

On **March 9** Germany declared war on Portugal, basing the declaration on Portuguese aid to the English, principally in Africa, and seizure of German ships at Lisbon.

Eight German steamships lying in the harbor at St. Vincent, Cape Verde Islands, were taken in charge, February 24, by officials of the Portuguese Government. The *Official Gazette* of Lisbon of February 25 announces that the 36 German and Austrian merchant vessels seized February 24 in the Tagus River and placed under the Portuguese flag are refitting in order to adapt them for the transport and other purposes for which they have been requisitioned. It is distinctly given to be understood that they have not been confiscated. Germany has addressed a sharp note to Portugal in protest against seizure of German merchant vessels by the Portuguese authorities. This measure is characterized as a violation of Germany's treaty rights, and the hope is expressed that Portugal will rescind its action.—*Army and Navy Journal*, 4/3.

WAR STRENGTH OF PORTUGAL.—Portugal's regular army consists of 30,000 regular troops and 230,000 reserves. She is credited with a maximum force of 870,000 fighting men. Her navy is negligible, consisting of five second-class cruisers and smaller craft, but her ports, from now on open to the British Navy, will be of great benefit to the allied fleets. (See p. 574.)

ITALY SEIZES GERMAN SHIPS.—In the House of Commons on February 29, announcement was made that 34 out of the 37 German ships interned in Italian ports had been requisitioned by the Italian Government. This action, following on a considerable popular clamor in Italy for war on Germany, may, it is thought, lead to a formal declaration of hostilities.—*N. Y. Nation*, 9/3.

The British liner *Appam*, West African coast to Plymouth, with 301 passengers and crew, was captured 60 miles north of Madeira on **January 16**, by the German commerce destroyer *Moewe*. The liner, with her passengers and crew and 138 persons transferred from other captured ships, was brought to Norfolk, Va., **February 1**, by a German prize crew of 22 men. According to a later statement of the German Admiralty, the *Moewe* returned to her home port **March 5**, after a successful cruise lasting several months.

LINER'S ASSAILANT.—The crew of the *Appam* say they were told that the *Moewe* passed through the Kiel Canal into the North Sea, where she escaped capture by the British patrols by flying the Swedish colors, which were also painted on her sides. Captain Harrison's own story sheds no light on this point. "The day was bright and clear when the *Appam* was captured," the captain said. "She was travelling at a fair speed when we sighted what appeared to be an ordinary tramp steamer, which gradually came closer. We feared no danger and made no preparations to resist, as we were not expecting any attack. Suddenly the tramp fired across our bows. I immediately hove to. Simultaneously the tramp's false forecastle head, which was apparently made of canvas, fell away, revealing a battery of huge guns. We surrendered without offering any resistance." The names of the seven steamers sunk by the *Appam's* assailant are given as *Trader, Arthur, Corbridge, Ariadne, Dromonby, Clan Mactavish*, and the *Farringford*. The *Clan Mactavish*, sunk on January 17, was only destroyed after a fight in which 15 men were killed. The other steamers were sunk without resistance between January 10 and 16. One suggestion put forward is that the *Möwe* is the Argo steamer of that name, of 1251 tons, belonging to Bremen.—*Army and Navy Gazette*, 5/2.

STATUS OF "APPAM."—On February 19 a U. S. marshal boarded the *Appam* and tacked a notice of libel to her mast. The proceedings were brought by the owners, the African Steam Navigation Co., Ltd., in the federal courts. Her cargo is valued by the owners at $2,000,000, the vessel itself at $2,000,000, and gold bullion and diamonds to the amount of $800,000 are said to be on board.

WASHINGTON, March 2.

The State Department to-day sent to the German Ambassador its decision in the case of the British liner *Appam*. Public announcement of the decision will be withheld, pending a decision in the libel action.

The court consequently will be permitted to interpret the Prussian-American treaty, which it is claimed by Germany, provides that a German prize may remain in American waters indefinitely, with immunity from legal proceedings instituted by the original owners in an attempt to regain possession of the ship. In awaiting an interpretation of the treaty by the courts, the State Department is acting in accordance with precedent. The executive branch of the government always has refrained from interfering with the judiciary in such cases.—*N. Y. Times*, 3/3.

CHARGE UNTRUTH IN "ARABIC" NOTE.—It is stated by British officials that the submarine which sank the *Arabic* on August 19 last was the *U-27*, and that this craft was destroyed by a British patrol boat the same day. This is considered to be verified by a German query through the American Embassy, as to whether Wilhelm Schulz, a warrant machinist of the *U-27*, had been rescued and was a British prisoner. If the British statement is accepted it throws an interesting light on the German memorandum of September 9 giving particulars of the attack, and on letter of Ambassador Bernstorff, October 5, quoting the report of the submarine commander.—*N. Y. Times*, 29/2.

AUSTRIA

"PETROLITE" AFFAIR.—The United States is preparing to make formal demands upon Austria-Hungary as a result of the attack by an Austrian submarine upon the American tank steamer *Petrolite* on December 5 last. A note on the subject will be dispatched within the next few days.

In reply, February 25, to the first American communication on the subject, Austria informed the State Department that its version of the affair was that the submarine commander thought the *Petrolite* an enemy ship disguised with the American flag; that he fired on the vessel because he believed it was about to ram his ship, and that the commander of the *Petrolite* voluntarily furnished provisions when asked to do so.

The State Department since has secured additional information from the captain and crew of the *Petrolite* directly contradictory to the Austrian version. They have declared in affidavits that the *Petrolite* was stopped in the Mediterranean by an Austrian submarine which fired a number of shells at her, that the submarine commander asked for food, which the commander of the *Petrolite* refused to give him, and that the commander of the submarine then held one of the members of the tanker's crew as a hostage while his men went aboard the ship and took such stores as they desired.—*N. Y. Times*, 4/3.

THE BALKAN STATES AND TURKEY

DIPLOMATIC BLUNDERING.—One of the root errors committed by our Foreign Office in concert with the Allies was the allotment of portions of the bear's skin before we had shot the bear. In effect, some of the arrangements into which we entered thus precipitately confirmed Bulgaria in her

resolve to take sides against us, damped the fitful ardor of Roumania, and prevented us from helping our Turkish friends who were ready to overturn their present government. A little reflection would have served to convince men of insight that nothing could well be more damaging to the Allied cause at that juncture than the formal allotment of Contantinople to Russia. The direct and inevitable result of the ear-marking of Constantine's city for the Tsardom must be a revulsion of feeling among Balkan neutrals from the Allies towards the Central Empires. M. Delcassé and Sir Edward Grey, with a generosity which would have challenged our admiration had it been compatible with justice to the Allies' common cause, lent a willing ear to Russia's solicitations, and the fateful transaction was completed. This momentous accord, many people imagine, was come to when M. Poincaré was the guest of the Tsar in Russia. Others believe it was concluded as far back as the time when the naval convention between France and Russia was drawn up. Both dates are wrong. It was completed in the beginning of April, 1915.—Extracts from article by DR. E. J. DILLON, *Fortnightly Review*, February.

UNITED STATES

NICARAGUA TREATY.—On February 18 the U. S. Senate ratified the proposed treaty with Nicaragua, under which the United States is to acquire perpetual right of way along the San Juan River and the Lake of Nicaragua for a transoceanic canal by the payment of $3,000,000 in gold.

General Chamorro, the Nicaraguan Minister, stated immediately after the Senate had acted that he expected early ratification of the convention by his government.

As originally negotiated by Mr. Bryan, as Secretary of State, with the Nicaraguan Governor Chamorra, the treaty contained provisions for American supervision practically tantamount to an American protectorate. To meet what was then understood as opposition, those provisions were eliminated before Mr. Bryan resigned his portfolio. To-day, in the Senate's resolution of ratification, those provisions, so far as they relate to American supervision of the expenditure of the $3,000,000, are largely restored.

The treaty provides for 99-year leases to Great Corn and Little Corn islands, and to a naval base yet to be selected on the Nicaraguan coast of Fonseca Bay.—*N. Y. Times*, 19/2.

THE MONROE DOCTRINE AND THE GREAT WAR.—An interesting article on this subject appears in the February *Nineteenth Century and After*. After pointing out that the Monroe Doctrine has "imposed a veritable strait-waistcoat on Germany, shutting her out of her place in the sun," and thus operating as a cause of the present European war, the writer turns to the origin of the doctrine. It was proposed by the British Minister Canning to the American Ambassador Rush in 1822, as a means of checkmating the plans of the Holy Alliance to bring back the revolting Spanish-American colonies under the Spanish yoke. "I called the New World into existence," wrote Canning, "to redress the balance of the Old." Rush proposed the policy of cooperation with England to Monroe, who at once consulted Jefferson. The latter replied:

MONTICELLO, October 24, 1823.

. . . . The question presented by the letters you have sent me is the most momentous which has ever been offered to my contemplation since that of Independence. That made us a nation, this sets our compass and points the course which we are to steer through the ocean of Time opening on us. . . . . America North and South has a set of interests distinct from those of Europe and peculiarly her own. While Europe is laboring to become the

domicile of despotism, our endeavor should surely be to make our hemisphere that of Freedom. One nation most of all could disturb us in this pursuit; she now offers to lead, aid, and accompany us in it. By acceding to her proposition we detach her from the band of despots, bring her mighty weight into the scale of free government and emancipate a Continent at one stroke which might otherwise linger long in doubt and difficulty. Great Britain is the nation which can do us the most harm of any one, or all, on earth; and with her on our side we need not fear the whole world. With her then we should most sedulously cherish a cordial friendship, and nothing would tend more to knit affections than to be fighting once more side by side in the same cause.

On December 2, 1823, Monroe sent the historic message to Congress.

During the century following, the writer asserts that South America has been preserved from European aggression not so much by the official sponsors of the Monroe Doctrine as by the power of the British fleet. The removal of such support would throw upon the United States a responsibility quite beyond her power to sustain. "It is proper to point out that while we [the British] gain nothing by the Monroe Doctrine, yet, seeing it is our fleet which alone keeps Germany out of Cuba and the New World, the 'loan' of that fleet is of transcendental importance to America."

UNITED STATES AND MEXICO

REPORT ON MEXICO.—On February 17 President Wilson transmitted to the Senate a reply prepared by the Department of State to the Senate resolution of inquiry of January 6, in which it is stated that in 1913, 1914, and 1915—generally covering the first three years of the present administration—76 Americans lost their lives in Mexico, 20 civilian Americans were killed in the United States as a result of border fighting, and 16 American soldiers were slain in the United States from the same cause—a total of 112 Americans. In the same time 87 Mexicans were killed in the United States by causes other than shots across the border, and 5 by such shots—a total of 92. This makes a grand total of 204 persons.—*N. Y. Times*, 17/2.

On **March 10**, Mexican bandits to the number of about 1500 under Francisco Villa attempted a raid on the town of Columbus, N. M. garrisoned by about 650 U. S. cavalry. In the engagement and pursuit following, nine United State soldiers, five civilians, and about 100 Mexicans were killed. American forces have been sent into Mexico to capture Villa and his followers.

In response to American representations to the Carranza Government with regard to the pursuit of Villa by United States troops, Carranza's Minister replied, March 10, indicating efforts made to establish order in Chihuahua, and requesting permission for Mexican forces to cross into United States territory, if necessary, in pursuit of Villa forces.

To this request the United States Government replied as follows:

WASHINGTON, March 13.

The government of the United States has received the courteous note of Señor Acuna [Carranza's Minister of Foreign Affairs], and has read with satisfaction his suggestion for reciprocal privileges to the American and Mexican authorities in the pursuit and apprehension of outlaws who infest their respective territories lying along the international boundary and who are a constant menace to the lives and property of residents of that region.

The government of the United States, in view of the unusual state of affairs which has existed for some time along the international boundary,

and earnestly desiring to cooperate with the de facto government of Mexico to suppress this state of lawlessness, of which the recent attack on Columbus, N. M., is a deplorable example, and to insure peace and order in the region contiguous to the boundary between the two republics, readily grants permission for military forces of the de facto government of Mexico to cross the international boundary in pursuit of lawless bands of armed men who have entered Mexico from the United States, committed outrages on Mexican soil, and fled into the United States, on the understanding that the de facto government of Mexico grants the reciprocal privilege that the military forces of the United States may pursue across the international boundary into Mexican territory lawless bands of armed men who have entered the United States from Mexico, committed outrages on American soil and fled into Mexico.

The government of the United States understands that, in view of its agreement to this reciprocal arrangement proposed by the de facto government, the arrangement is now complete and in force, and the reciprocal privileges thereunder may accordingly be exercised by either government without further interchange of views.

It is a matter of sincere gratification to the government of the United States that the de facto government of Mexico has evinced so cordial and friendly a spirit of cooperation in the efforts of the authorities of the United States to apprehend and punish the bands of outlaws, who seek refuge beyond the international boundary in the erroneous belief that the constituted authorities will resent any pursuit across the boundary by the forces of the government whose citizens have suffered by the crimes of the fugitives.

With the same spirit of cordial friendship the government of the United States will exercise the privilege granted by the de facto government of Mexico, in the hope and confident expectation that by their mutual efforts lawlessness will be eradicated and peace and order maintained in the territories of the United States and Mexico contiguous to the international boundary.

Secretary of State Lansing also issued this statement:

In order to remove any misapprehension that may exist either in the United States or in Mexico, the President has authorized me to give in his name the public assurance that the military operations now in contemplation by this government will be scrupulously confined to the object already announced, and that in no circumstances will they be suffered to infringe in any degree upon the sovereignty of Mexico or develop into intervention of any kind in the internal affairs of our sister republic. On the contrary, what is now being done is deliberately intended to preclude the possibility of intervention.—*N. Y. Times*, 13/3.

NAVAL NOTES

Naval developments in the following strategic areas will be considered separately and in turn:

	PAGE
1. TABLE OF NAVAL LOSSES	643
2. NORTH SEA	652
3. BALTIC SEA	658
4. ADRIATIC SEA	659
5. MEDITERRANEAN	661
6. BLACK SEA	664
7. ATLANTIC	665
8. EAST AFRICA	667
9. PACIFIC	669

TABLE OF NAVAL LOSSES OF THE VARIOUS BELLIGERENTS SINCE THE OUTBREAK OF WAR

TABLE OF NAVAL LOSSES OF THE VARIOUS BELLIGERENTS SINCE THE OUTBREAK OF WAR

The following table is compiled from various articles appearing in the press of the several belligerent nations. These reports are so contradictory that it is impossible to furnish an absolutely correct list of vessels lost to date. In many cases the belligerent powers have failed to acknowledge the losses of all the vessels. No attempt has been made to include herein a list of the various trawlers, mine-sweepers and such odd small craft which may have been destroyed while mine-sweeping or on submarine patrol duty.

(On the left margin of this table of losses is a page reference to the Naval Institute War Notes.)

Losses of Great Britain and Her Allies

BRITISH WARSHIP LOSSES

PAGE VOL. 41	PAGE VOL. 42	NAME	TYPE	TONNAGE	REMARKS	DATE
245, 653, 1874		Audacious	battleship	24,000	Reported sunk off Irish coast. Cause not known. Loss neither affirmed nor denied by British Admiralty	29-10-14
247		Bulwark	battleship	15,000	Blown up by internal explosion while at anchor in the Thames	25-11-14
644		Formidable	battleship	15,000	Sunk by German submarine, North Sea	1- 1-15
658		Irresistible	battleship	15,000	Sunk in the Dardanelles	18- 3-15
658		Ocean	battleship	12,950	Sunk in the Dardanelles	18- 3-15
	300, 652	King Edward VII	battleship	16,350	By mine	9- 1-16
1373		Goliath	battleship	12,950	Torpedoed in Dardanelles	12- 5-15
1374	313	Triumph	battleship	11,800	Sunk by submarine in the Dardanelles	25- 5-15
1374		Majestic	battleship	14,900	Sunk by submarine in the Dardanelles	27- 5-15
	300, 652	Natal	armored cruiser	13,360	Internal explosion and sunk at anchor	30-12-15
1583		Warrior	protected cruiser	13,550	By mine	5- 9-14
1567		Amphion	light cruiser	3,360	Sunk by mine in the North Sea	6- 8-14
1583		Pegasus	light cruiser	2,135	Sunk by German cruiser Koenigsberg at Zanzibar	20- 9-14
	652	Arethusa	light cruiser	3,750	By mine off East Coast of England	14- 2-16
249		Hermes	light cruiser	5,600	Sunk by German submarine U-27, North Sea	31-10-14
1863		Hogue	cruiser	12,000	Sunk by German submarine U-29 in the North Sea	22- 9-14
1863		Cressey	cruiser	12,000	Sunk by German submarine U-29 in the North Sea	22- 9-14
1863		Aboukir	cruiser	12,000	Sunk by German submarine U-29 in the North Sea	22- 9-14
1867		Hawke	cruiser	7,350	Sunk by German submarine U-9, North Sea	16-10-14
271, 1886		Good Hope	cruiser	14,100	Sunk by German forces in Pacific	1-11-14
271, 1886		Monmouth	cruiser	9,800	Sunk by German forces in Pacific	1-11-14
2133		Argyll	cruiser	10,850	Ran aground off east coast of Scotland	28-10-15
		Bullfinch	destroyer	370	Sunk in collision with a Dutch merchant ship	18- 8-14
		——	destroyer	——	Ran ashore, Scotch coast	27-12-14
		Erne	destroyer	550	Wrecked in a storm probably in	- 2-15
1364, 1007		Recruit	destroyer	385	Sunk by German submarine in North Sea.	1- 5-15
1364, 1004		Maori	destroyer	1,035	Blown up by a mine off Belgian coast	7- 5-15
1728		Lynx	destroyer	935	Sunk by mine	10- 8-15

BRITISH WARSHIP LOSSES—Continued

PAGE VOL. 41	PAGE VOL. 42	NAME	TYPE	TONNAGE	REMARKS	DATE
	316	Louis	destroyer	965	Wrecked in the Eastern Mediterranean	10-11-15
	655	Coquette	destroyer	355	Sunk by mine, North Sea	?- 3-16
1366		No. 10	torpedoboat	244	Sunk by German submarine in North Sea	10- 6-15
1366		No. 12	torpedoboat	253	Sunk by German submarine in North Sea	10- 6-15
2140		No. 96	torpedoboat	130	Sank after a collision with merchantman in Straits of Gibraltar	1-11-15
	655	No. 11	torpedoboat	253	Sunk by mine, North Sea	?- 3-16
1583		Speedy	torpedo gunboat	810	Sunk by mine in the North Sea	3- 9-14
250, 1873		Niger	torpedo gunboat	810	Sunk by German submarine while at anchor	11-11-14
1583		AE-1	submarine	725-810	Accidentally sunk off Australian coast	14- 9-14
1871		E-3	submarine	725-810	Rammed and sunk by German vessel	18-10-14
247, 1873		D-5	submarine	550-600	Sunk by German mine, North Sea	3-11-14
		D-2	submarine	550-600	Reported by press at lost. Details not known	1-12-14
		E-10	submarine	725-810	Did not return from a trip into the North Sea	
1018		E-15	submarine	725-810	Ran aground in the Dardanelles and destroyed by own picket boats	17- 4-15
	653	——	submarine	——	Stranded, Dutch Coast	6- 1-16
1373	652	E-17	submarine	725-810	Reported as sunk off Holland	6- 1-16
1727, 2136		AE-2	submarine	725-810	Sunk in the Sea of Marmora	30- 4-15
		E-13	submarine	725-810	Sunk by German torpedo craft off Danish coast	19- 8-15
2147		E-7	submarine	725-810	Sunk at Dardanelles	4- 9-15
2146	316	E-20	submarine	——	Announced as sunk by Turks in Dardanelles	5-11-15
		——	submarine	——	Sunk off Holland	6- 1-16
1874		Oceanic	auxiliary cruiser	17,274	Ran aground off north coast of Scotland in storm	8- 9-14
	653	Alcantara	auxiliary cruiser	15,300	Sunk in battle, North Sea	29- 2-16
		Rohilla	auxiliary cruiser	7,400	Ran aground off Whitby and completely wrecked	30-10-14
649		Viknor	auxiliary cruiser	5,386	Lost off Irish coast	14- 1-15
		Clan Macnaughton	auxiliary cruiser	4,985	Lost in a gale	3- 2-15
1005		Bayano	auxiliary cruiser	5,948	Probably torpedoed by German submarine in Irish Sea	12- 3-15
1729		Ramsey	auxiliary cruiser	——	Sunk by German auxiliary cruiser Meteor in North Sea	8- 8-15
1728		India	auxiliary cruiser	7,900	Sunk by German submarine, North Sea	10- 8-15
1365		Princess Irene	minelayer	——	Blown up by internal explosion off Sheerness	27- 5-15
1755		Royal Edward	transport	11,117	Sunk by submarine in Ægean Sea	14- 8-15
2138		Marquette	transport	7,057	Sunk by German submarine in Ægean Sea	26-10-15
2138		Ramazan	transport	3,477	Sunk by German submarine in Ægean Sea	17- 9-15
	309	Woodfield	transport	——	Sunk off coast of Morocco	30-11-15
		Hythe	auxiliary	291	Collision, Ægean	

1755	Royal Edward	transport	11,117	Sunk by submarine in Ægean Sea	14- 8-15
2138	Marquette	transport	7,057	Sunk by German submarine in Ægean Sea	26-10-15
2138	Ramazan	transport	3,477	Sunk by German submarine in Ægean Sea	17- 9-15
309	Woodfield	transport	——	Sunk off coast of Morocco	30-11-15
	Hythe	auxiliary	201	Collision, Ægean	29-10-15
2140 309	Tara	armored boarding vessel	6,322	Sunk by German submarine in Mediterranean Sea	5-11-15
309	Abbas	Egyptian coast guard	298	Sunk by German submarine off Sollum Harbor	6-11-15
309	Abdel Monaym	Egyptian coast guard	598	Sunk by German submarine off Sollum Harbor	6-11-15
	Fishguard II	training ship	——	Foundered in a gale in the North Sea	17- 9-14
301	Anglia	hospital ship	1,862	Sunk by mine, English Channel	17-11-15
253, 1583	Pathfinder	scout	2,940	Sunk by German submarine in North Sea	5- 9-14
301	Aries	yacht	——		15
301	Irene	yacht	——		15

In addition to the above, the press reports that several other English submarines have been destroyed. The list above includes only those which were apparently officially announced by the British Admiralty.

FRENCH WARSHIP LOSSES

658	Bouvet	battleship	12,007	Sunk at the Dardanelles	18- 3-15
1012	Leon Gambetta	armored cruiser	12,352	Torpedoed by Austrian submarine in the Straits of Otranto	26- 4-15
661	Amiral Charnier	cruiser	4,702	Torpedoed, Mediterranean	8- 2-16
666	Mousquet	destroyer	298	Sunk by German cruiser Emden at Penang	28-10-14
656	Dague	destroyer	720	Sunk by Austrian mine off Antivari	24- 2-15
	Branlebas	destroyer	330	Sunk by mine	
661	Renaudin	destroyer	756	Torpedoed, Adriatic	18- 3-16
	No. 347	torpedoboat	97	Sunk in collision with each other	9-10-14
	No. 338	torpedoboat	97	Sunk in collision with each other	9-10-14
	——	torpedoboat	——	Reported to have been lost in	-1-15
	No. 331	torpedoboat	97	Sunk in collision off Cherbourg	16- 6-15
	No. 219	torpedoboat	87	Sunk off Nieuport	- 1-15
260	Curie	submarine	392	Sunk by Austrians at Pola	23-12-14
655	Saphir	submarine	386- ?	Sunk at the Dardanelles	15- 1-15
	Joule	submarine	392- ?		
	Calypso	submarine	345-490	Rammed and sunk during maneuvers off Cape Lardier	8- 7-15
1756	Mariotte	submarine	522-615	Sunk at the Dardanelles	20- 7-15
2142	Turquoise	submarine	386- ?	Sunk in the Sea of Marmora	3-11-15
308	Fresnel	submarine	392- ?	Sunk in the Adriatic by an Austrian ship	5-12-15
	Zelée	gunboat	636	Sunk by German cruisers at Tahiti	22- 9-14
662	Provence	auxiliary cruiser	18,400	Torpedoed, Mediterranean	26- 2-16
	Indian	auxiliary cruiser	800	Sunk by submarine off Rhodes	8- 9-15
1375, 1755	Casa Bianca	minelayer	945	Sunk in the Ægean Sea by a mine	3- 6-15
	Calvados	troopship	——	Submarine, Mediterranean	-11-15
308	Monge		392- ?	Sunk by Austrians in Adriatic	28-12-15

RUSSIAN WARSHIP LOSSES

PAGE VOL. 41	PAGE VOL. 42	NAME	TYPE	TONNAGE	REMARKS	DATE
		Pallada	armored cruiser	7,775	Sunk by German submarine in Baltic	11-10-14
267, 666		Jemtchug	cruiser	3,130	Sunk by German cruiser in Penang	28-10-14
	664	Leit Pushtscheen	torpedoboat	——	Sunk by mine, Black Sea	10- 3-16
		Putschino	torpedoboat	——	By gun fire	30-10-14
		Donnetz	gunboat	1,224	Sunk by Turks in Black Sea. Raised by Russians	31-10-14
		Kubanez	gunboat	1,280	Reported by Turks as having been sunk by a Turkish destroyer	29-10-14
1732		Sivutch	gunboat	875	Sunk by Germans in Baltic Sea	20- 8-15
		Kubanetz	gunboat	1,200	By gun fire, Odessa	29-10-14
261		Prut	auxiliary cruiser	5,440	Scuttled to avoid capture	29-10-14
1367		Yenisei	minelayer	2,926	Sunk by a German submarine in Baltic	4- 6-15
		Oleg	minelayer	1,125	Sunk, Black Sea	24-12-14
		Athos	minelayer	1,743	Sunk, Black Sea	24-12-14
		Riasan	transport	3,522	Captured by Emden	6- 8-14

Various German reports state that Russian men-of-war were destroyed in the several minor engagements in the Baltic. These losses were never officially announced by the Russian Admiralty.

JAPANESE WARSHIP LOSSES

		Shirotaye	destroyer	380	Ran ashore, Tsing Tao	4- 9-14
		No. 33	torpedoboat	82	Sunk by mines while mine-sweeping off Tsing Tao	11-11-14
		Name unknown	torpedoboat	——	By mine	
1878	669	Takachiho	schoolship	3,700	Torpedoed by German destroyer, S-90, off Tsing Tao	17-10-14

In addition to the above, five special service ships were sunk during the operations off Tsing Tao.

ITALIAN WARSHIP LOSSES

2137		Benedetto Brin	battleship	13,215	Blown up and sunk by an internal explosion	28- 9-15
1371		Amalfi	armored cruiser	9,958	Sunk by an Austrian submarine in the Adriatic	7- 7-15
1370		Garibaldi	armored cruiser	7,234	Torpedoed off Ragusa by Austrian submarine	18- 7-15
1370		Turbine	destroyer	325	Scuttled to avoid capture after an engagement with Austrian vessels in the Adriatic	24- 5-15
	308	Intrepido	destroyer	680	Sunk by mine in the Adriatic	17-12-15
		5-PN	torpedoboat	118	Torpedoed by Austrian submarine off Venice	26- 6-15
		17-OS	torpedoboat	118	Sunk by one of her own mines while mine-laying off Salvore	7-15
1370		Medusa	submarine	241-295	Torpedoed and sunk by an Austrian submarine	17- 6-15
		Nereide	submarine	221-315	Sunk by Austrian submarine in Adriatic	5- 8-15
	308	Re Umberto	transport	——	Sunk by mine in the Adriatic	17-12-15

LOSSES OF GERMANY AND HER ALLIES
GERMAN WARSHIP LOSSES

PAGE VOL. 41	PAGE VOL. 42	NAME	TYPE	TONNAGE	REMARKS	DATE
		Yorck	armored cruiser	9,050	Sunk by mine in the Jade	3-11-14
		Cöln	light cruiser	4,350	Sunk by British submarine in the Bight	18- 1-15
		Mainz	light cruiser	4,350	Sunk by British submarine in the Bight	17- 8-14
		Ariadne	light cruiser	2,912	Sunk by British submarine in the Bight	5- 9-14
		Hela	light cruiser	2,650	Sunk by British submarine in the Bight	13- 8-14
		Magdeburg	light cruiser	4,350	Ran ashore in the Gulf of Finland	26- 8-14
		Koln	light cruiser	4,350	Sunk by mine in the Bight	28-10-14
		Frauenlob	light cruiser	2,658	Sunk by British submarine in the Bight	4-11-14
		Pfeil	gunboat	1,600	Sunk by mine in the Bight	15-11-14
		Blücher	armored cruiser	15,550	Sunk by British battle-cruisers in the North Sea	24- 1-15
		Gneisenau	armored cruiser	11,600	Sunk by mine in the Baltic	9- 8-15
		Scharnhorst	armored cruiser	11,600	Sunk by mine in the Baltic	9- 8-15
		Leipzig	light cruiser	3,200	Sunk by British battle-cruisers in the North Sea	8-12-14
		Nürnberg	light cruiser	3,200	Sunk by British battle-cruisers in the North Sea	8-12-14
		Emden	light cruiser	3,600	Ran ashore on North Keeling Island	9-11-14
		Königsberg	light cruiser	3,350	Sunk by British warships in the Rufiji River	11- 7-15
		Karlsruhe	light cruiser	4,820	Sunk by mine in the Caribbean Sea	4-11-14
		Dresden	light cruiser	3,544	Scuttled to avoid capture in Juan Fernandez	14- 3-15
		Cormoran	gunboat	1,600	Interned in Tsing Tao	7-11-14
		Geier	gunboat	1,600	Interned in Tsing Tao	7-11-14
		Iltis	gunboat	1,600	Interned in Tsing Tao	7-11-14
		Tsingtau	gunboat	1,600	Interned in Tsing Tao	7-11-14
		Jaguar	gunboat	1,600	Interned in Tsing Tao	7-11-14
		Luchs	gunboat	1,600	Interned in Tsing Tao	7-11-14
		Tiger	gunboat	1,600	Interned in Tsing Tao	7-11-14
		Seeadler	auxiliary cruiser	3,000	Wrecked on Mopelia Island	21- 3-17
		Wolf	auxiliary cruiser	5,809	Returned to Germany	1- 2-18
		Möwe	auxiliary cruiser	8,000	Returned to Germany	4- 1-19
		Greif	auxiliary cruiser	8,000	Returned to Germany	22- 3-19
		Cormoran	auxiliary cruiser	5,809	Interned in Java	10- 2-17
		Prinz Eitel Friedrich	auxiliary cruiser	8,000	Interned in United States	11- 3-17
		Kronprinz Wilhelm	auxiliary cruiser	14,908	Interned in United States	11- 3-17
		Kaiser Wilhelm der Grosse	auxiliary cruiser	14,349	Sunk by British warships in Kiao-Chau Bay	14-11-14
		Cormoran	auxiliary cruiser	5,809	Interned in Java	10- 2-17
		Prinz Eitel Friedrich	auxiliary cruiser	8,000	Interned in United States	11- 3-17
		Kronprinz Wilhelm	auxiliary cruiser	14,908	Interned in United States	11- 3-17
		Kaiser Wilhelm der Grosse	auxiliary cruiser	14,349	Sunk by British warships in Kiao-Chau Bay	14-11-14
		Meteor	auxiliary cruiser	5,809	Sunk by British warship in the North Sea	29- 8-16
		Moltke	battle-cruiser	22,616	Sunk by British submarine in the Baltic	19-10-17
		Goeben	battle-cruiser	22,979	Sunk by mine in the Black Sea	20- 1-18
		Derfflinger	battle-cruiser	26,180	Sunk by British warships in the Baltic	21- 6-19
		Seydlitz	battle-cruiser	24,988	Sunk by British warships in the Baltic	21- 6-19
		Von der Tann	battle-cruiser	19,100	Sunk by British warships in the Baltic	21- 6-19
		Hindenburg	battle-cruiser	26,180	Sunk by British warships in the Baltic	21- 6-19
		Lützow	battle-cruiser	26,180	Sunk by British warships in the Baltic	21- 6-19
		Pommern	battleship	13,040	Sunk by British submarine in the Baltic	19- 8-15
		Schlesien	battleship	13,040	Sunk by British submarine in the Baltic	4- 9-15
		Schleswig-Holstein	battleship	13,040	Sunk by British submarine in the Baltic	4- 9-15
		Hessen	battleship	13,040	Sunk by British submarine in the Baltic	4- 9-15
		Braunschweig	battleship	14,000	Sunk by mine in the Bight	19- 5-16
		Elsass	battleship	13,040	Sunk by mine in the Baltic	5- 8-15
		Hannover	battleship	13,040	Sunk by mine in the Baltic	5- 8-15
		Preussen	battleship	13,040	Sunk by mine in the Baltic	5- 8-15
		Posen	battleship	13,040	Sunk by mine in the Baltic	5- 8-15
		Rheinland	battleship	13,040	Sunk by mine in the Baltic	5- 8-15
		Westfalen	battleship	13,040	Sunk by mine in the Baltic	5- 8-15
		Pommern	battleship	13,040	Sunk by British submarine in the Baltic	19- 8-15
		Schlesien	battleship	13,040	Sunk by British submarine in the Baltic	4- 9-15
		Schleswig-Holstein	battleship	13,040	Sunk by British submarine in the Baltic	4- 9-15
		Hessen	battleship	13,040	Sunk by British submarine in the Baltic	4- 9-15
		Braunschweig	battleship	14,000	Sunk by mine in the Bight	19- 5-16
		Elsass	battleship	13,040	Sunk by mine in the Baltic	5- 8-15
		Hannover	battleship	13,040	Sunk by mine in the Baltic	5- 8-15
		Preussen	battleship	13,040	Sunk by mine in the Baltic	5- 8-15
		Posen	battleship	13,040	Sunk by mine in the Baltic	5- 8-15
		Rheinland	battleship	13,040	Sunk by mine in the Baltic	5- 8-15
		Westfalen	battleship	13,040	Sunk by mine in the Baltic	5- 8-15
		Deutschland	battleship	13,040	Sunk by mine in the Baltic	5- 8-15
		Pommern	battleship	13,040	Sunk by British submarine in the Baltic	19- 8-15
		Schlesien	battleship	13,040	Sunk by British submarine in the Baltic	4- 9-15
		Schleswig-Holstein	battleship	13,040	Sunk by British submarine in the Baltic	4- 9-15
		Hessen	battleship	13,040	Sunk by British submarine in the Baltic	4- 9-15
		Braunschweig	battleship	14,000	Sunk by mine in the Bight	19- 5-16
		Elsass	battleship	13,040	Sunk by mine in the Baltic	5- 8-15
		Hannover	battleship	13,040	Sunk by mine in the Baltic	5- 8-15
		Preussen	battleship	13,040	Sunk by mine in the Baltic	5- 8-15
		Posen	battleship	13,040	Sunk by mine in the Baltic	5- 8-15
		Rheinland	battleship	13,040	Sunk by mine in the Baltic	5- 8-15
		Westfalen	battleship	13,040	Sunk by mine in the Baltic	5- 8-15
		Deutschland	battleship	13,040	Sunk by mine in the Baltic	5- 8-15

1370	Medusa	submarine	241-295	Torpedoed and sunk by an Austrian submarine	17- 6-15
	Nereide	submarine	221-315	Sunk by Austrian submarine in Adriatic	5- 8-15
308	Re Umberto	transport	——	Sunk by mine in the Adriatic	17-12-15

GERMAN WARSHIP LOSSES

PAGE VOL. 41	PAGE VOL. 42	NAME	TYPE	TONNAGE	REMARKS	DATE
247		Yorck	armored cruiser	9,350	Ran on a German mine and sunk near Wilhelmshaven	3-11-14
276, 673, 1385		Scharnhorst	armored cruiser	11,420	Sunk by English forces off the Falkland Islands	8-12-14
276, 673, 1385		Gneisenau	armored cruiser	11,420	Sunk by English forces off the Falkland Islands	8-12-14
258		Friederich Karl	armored cruiser	8,858	No official report as to the loss of this vessel. Press reports state, however, that she was lost in the Baltic in	-12-14
632		Bluecher	armored cruiser	15,550	Sunk by British forces off the Doggerbank	24- 1-15
2135		Prinz Adalbert	armored cruiser	8,858	Sunk by British submarine in Baltic	23-10-15
1569, 1856		Mainz	protected cruiser	4,280	Sunk by British forces in the North Sea	28- 8-14
1569, 1856		Koeln	protected cruiser	4,280	Sunk by British forces in the North Sea	28- 8-14
1569, 1856		Ariadne	protected cruiser	2,618	Sunk by British forces in the North Sea	28- 8-14
1871, 1861		Hela	protected cruiser	2,003	Sunk by British submarine E-9, in North Sea	13- 9-14
1566		Augsburg	protected crusier	4,280	By gun fire	7- 8-14
262, 666, 1880		Emden	protected cruiser	3,592	Sunk by Australian cruiser Sydney in Indian Ocean	9-11-14
262, 666, 1880, 2153		Leipzig	protected cruiser	3,200	Sunk by English forces off the Falkland Islands	8-12-14
276, 673, 1386		Nurnberg	protected cruiser	3,396	Sunk by English forces off the Falkland Islands	8-12-14
1387		Dresden	protected cruiser	3,592	Sunk by British cruisers in Pacific	14- 3-15
270, 670, 1388	667	Koenigsberg	protected cruiser	3,340	Sunk by English forces in Rufiji River	11- 7-15
2135	306	Undine	protected cruiser	2,672	Sunk by British submarine in the Baltic	7-11-15
	304	Bremen	protected cruiser	3,300	Sunk by submarine in the Baltic	17-12-15
1732		——	two light cruisers	——	Gulf of Riga	17- 8-15
1566		Magdeburg	small cruiser	4,478	Ran ashore in fog in Baltic and blown up by her own crew after an engagement with Russians	27- 8-14
283		Geier	small cruiser	1,630	Interned in Honolulu	8-11-14
	677	Karlsruhe	small cruiser	4,822	No official report by any of the belligerents as to this vessel's destruction. Press reports state she was, however, blown up by an internal explosion while cruising in the Atlantic Ocean	-11-14
1860		V-187	destroyer	689	Sunk by British forces in the North Sea	28- 8-14
1869		S-115	destroyer	413	Sunk by English destroyers in North Sea	17-10-14
1869		S-117	destroyer	413	Sunk by English destroyers in North Sea	17-10-14
1869		S-118	destroyer	413	Sunk by English destroyers in North Sea	17-10-14
1869		S-119	destroyer	413	Sunk by English destroyers in North Sea	17-10-14
1878	669	S-90	destroyer	396	Driven ashore and wrecked by her own crew off Tsing-Tao after having torpedoed the Japanese ship Takachiho	20-10-14
270		Taku	destroyer	276	Sunk by Germans in Kiao-Chau Bay before surrendering Tsing-Tao to Allies	7-11-15

GERMAN WARSHIP LOSSES—Continued

PAGE VOL. 41	PAGE VOL. 42	NAME	TYPE	TONNAGE	REMARKS	DATE
250		S-124	destroyer	463	Accidentally rammed and sunk by a merchant vessel in Baltic	22-11-14
		V-186	destroyer	750	By gun fire	
		S-106	destroyer	675	By gun fire	
1861		S-126	destroyer	487	By submarine	6-10-14
1730		G-196	destroyer	689	Sunk by British submarine in North Sea	26- 7-15
1726		——	destroyer	——	Announced by France as having been sunk by two French torpedoboats off the Belgian coast	22- 8-15
		——	destroyer	——	Reported sunk by the Russians in the Baltic	19- 8-15
		——	destroyer	——	Reported as sunk by British submarine E-19 between Denmark and Sweden. Not confirmed	14-10-15
		S-116	torpedoboat	477	Sunk by English submarine E-9 in the North Sea	6-10-14
		A-2	torpedoboat	about 150	Sunk by British destroyers in North Sea	1-15-15
		A-6	torpedoboat	about 150	Sunk by British destroyers in North Sea	1-15-15
		——	torpedoboat	——	Officially announced by Russia as having been blown up by mine	30- 6-15
		——	torpedoboat	——	Announced by German Admiralty as sunk by mines in the Baltic	19- 8-15
		——	torpedoboat	——	Announced by German Admiralty as sunk by mines in the Baltic	19- 8-15
		——	torpedoboat	——	Sunk by submarine in the Baltic	17-12-15
1732		——	eight torpedoboats	——	Gulf of Riga	17- 8-15
		——	torpedoboat	——	Collision, Baltic	15-10-15
1568		U-15	submarine	about 450	Sunk by British cruiser Birmingham	10-10-14
250		U-18	submarine	——	Destroyed by the English destroyer Garry off Scotch coast	23-11-14
2132	306	U-8	submarine	246-295	Sunk by British destroyers	4- 3-15
		U-51	submarine	——	Sunk, Black Sea	17- 7-15
		U-12	submarine	246-295	Rammed and sunk by the British destroyer Ariel	10- 3-15
1009		U-29	submarine	——	Announced as sunk by British forces. Loss admitted by German Admiralty	26- 3-15
		U-14	submarine	about 300	Sunk by British forces about	8- 6-15
		U-	submarine	——	Officially announced by French as having been sunk in the English Channel by French squadron	4- 7-15
1729		U-27	submarine	840-890	Announced by German Admiralty as missing	10- 8-15
		——	submarine	——	Announced by English Admiralty as having been sunk by a British aeroplane off Belgian coast. Denied by Germany	20- 8-15
		——	submarine	——	Reported as having run ashore near Riga in the Baltic and probably lost. Not con-	

		——	submarine		——	Reported as having run ashore near Riga in the Baltic and probably lost. Not confirmed by Germany	19- 8-15
		U-	submarine		——	Interned in Holland. Reported as being the U-8, but this vessel had been officially reported as having been sunk by the British	
		U-	submarine		——	Reported by British Admiralty as having been sunk by a British seaplane off Belgian coast	27-11-15
648		U-3	submarine		——	Rammed	9- 8-14
		Moewe	gunboat		640	Sunk by her own crew at Dar-es-Salam when English vessels appeared	14- 8-14
		Wissman	gunboat	about	300	Captured by English on Lake Nyasa	20- 8-14
		Planet	gunboat		640	Sunk by her own crew at Yap Island on approach of Japanese fleet	7-10-14
270	669	Cormoran	gunboat		1,604	Sunk by Germans in Kiao-Chau Bay before surrendering Tsing-Tao to Allies	7-11-15
270	669	Iltis	gunboat		886	Sunk by Germans in Kiao-Chau Bay before surrendering Tsing-Tao to Allies	7-11-15
270	669	Tiger	gunboat		886	Sunk by Germans in Kiao-Chau Bay before surrendering Tsing-Tao to Allies	7-11-15
270	669	Luchs	gunboat		886	Sunk by Germans in Kiao-Chau Bay before surrendering Tsing-Tao to Allies	7-11-15
270	669	Jaguar	gunboat		886	Sunk by Germans in Kiao-Chau Bay before surrendering Tsing-Tao to Allies	7-11-15
		Tsing-tau	gunboat		168	Interned, China	17- 8-14
		Vaterland	gunboat		168	Interned, China	17- 8-14
		Prince Adalbert	auxiliary cruiser		6,030	Captured by British cruiser	- 8-14
		Sudmark	auxiliary cruiser		5,113	Captured by British cruiser	15- 8-14
1578		Hedwick von Kaiser Wilhelm der Grosse	auxiliary cruiser		13,952	Sunk by British cruiser Highflyer	27- 8-14
		Bethania	auxiliary cruiser		7,548	Captured by British cruiser	7- 9-14
		Spreewald	auxiliary cruiser		3,899	Captured by British cruiser	12- 9-14
1584		Cap Trafalgar	auxiliary cruiser		18,710	Sunk by British auxiliary cruiser Carmania	14- 9-14
		Max Brock	auxiliary cruiser		4,579	Captured by British cruiser	- 9-14
1729		Itolo	auxiliary cruiser		299	Sunk by French gunboat at Cameroon	24- 9-14
		Rhios	auxiliary cruiser		150	Sunk by French gunboat at Cameroon	24- 9-14
		Soden	auxiliary cruiser		150	Captured by English cruiser off Cameroon River	1-10-14
		Gneisenau	auxiliary cruiser		8,185	Sunk by Belgians prior to evacuation of Antwerp	8-10-14
		Graecia	auxiliary cruiser		2,753	Captured by an English cruiser	10-10-14
		Markomannia	auxiliary cruiser		4,505	Sunk by British cruiser in Indian Ocean	16-10-14
		Navarra	auxiliary cruiser		5,794	Sunk by English auxiliary cruiser in Atlantic	11-11-14
		Eleonore Woermann	auxiliary cruiser		4,624	Sunk by Australian cruiser Australia	6- 1-15
1386		Macedonia	auxiliary cruiser		4,347	Captured	30- 4-15

GERMAN WARSHIP LOSSES—Continued

PAGE VOL. 41	PAGE VOL. 42	NAME	TYPE	TONNAGE	REMARKS	DATE
		——	auxiliary cruiser ..	——	Reported as sunk in the Baltic in	- 8-15
	653	Greif	auxiliary cruiser ..	1,165	Sunk in battle, North Sea	29- 2-16
		Friedrich	converted cruiser ..	8,865	Interned in Norfolk	7- 4-15
986		Kronprinz Wilhelm	converted cruiser ..	14,705	Interned in Norfolk	29- 4-15
252		Berlin	converted cruiser ..	17,324	Interned in Norway	16-11-14
		Patagonia	converted cruiser ..	——	Seized by Argentina, violation of neutrality.	
		Eber	converted cruiser ..	1,000	Interned at Bahia	- 9-14
	282	Kormoran II	converted cruiser ..	3,508	Interned at Guam	15-12-14
		Kingani	armed merchant vessel	——	Captured by the British on Lake Tanganyka	
1566		Königin Luise	minelayer	2,163	Sunk by English destroyer in North Sea	5- 8-14
		Rufin	minelayer	——	Sunk by Germans in Kiao-Chau Bay before surrendering Tsing-Tao to Allies	7-11-15
		——	minelayer	——	Reported by the French to have been captured outside of Havre disguised as a French collier	
1368, 1734		Albatross	minelayer	2,165	Sunk by Russians in Baltic. Reported as having been raised and interned in Sweden	2- 7-15
1729		Meteor	minelayer	3,613	Sunk by her own crew after attempting to escape from British forces in the North Sea	8- 8-15
		Karnac	auxiliary transport.	4,437	Interned in Chile	-11-14
1885		Comet	auxiliary sailing cruiser	977	Captured by Australian forces	18-10-14
	304	Bunz	patrol boat	——	Lost in Baltic	17-12-15
986		Prinz Eitel Locksun	naval tender	1,020	Interned in Honolulu	8-11-14
1364		Ophelia	——	1,153	Captured by English cruiser in the North Sea. English claim this vessel to be an auxiliary cruiser, while Germany claims her to be a hospital ship	17-10-15

In addition to the above, there seems to be no doubt but that a great number of German submarines have been destroyed around the British Isles and possibly also in the Mediterranean and near the Dardanelles. The exact number of German submarines sunk during this war is not known, although the press state this number to be at least 50 and possibly as many as 70.

AUSTRIAN WARSHIP LOSSES

1574		Zenta	cruiser	2,264	Sunk by French fleet off Antivari	16- 8-14
270	669	Kaiserin Elizabeth	cruiser	3,937	Sunk by her own crew at Tsing-Tao	7-11-14
	307	——	cruiser, Novara type	3,384	Torpedoed	13- 1-16
	307	Triglav	destroyer	787	Sunk by gun fire in Adriatic	29-12-15
	307	Lika	destroyer	787	Sunk by mine in Adriatic	29-12-15
1584		No. 19	torpedoboat	78	Struck by a mine and sank at entrance to Pola	18- 8-14
		——	torpedoboat	——	Sunk by mine in Adriatic	
		——	torpedoboat	——	Sunk by mine in Adriatic	
		——	submarine	——	Sunk by an Italian destroyer	17- 5-15
		U-18	submarine	68-860	Reported by [illegible]	[illegible]

307	Lika	destroyer	78	Struck by a mine and sank at entrance to Pola	18- 8-14
1584	No. 19	torpedoboat			
	——	torpedoboat	——	Sunk by mine in Adriatic	
	——	torpedoboat	——	Sunk by mine in Adriatic	
	——	submarine	——	Sunk by an Italian destroyer	17- 5-15
	U-18	submarine	685-860	Reported by France to have been sunk by a French aeroplane in the Adriatic	1- 7-15
1735	U-12	submarine	——	Torpedoed and sunk by an Italian submarine in the upper Adriatic	12- 8-15
1734	U-3	submarine	233-295	Sunk by French destroyer Bisson	13- 8-15
	——	submarine	——	Gun fire, French fleet	
	U-11	submarine	860	Sunk by aeroplane	1- 7-15
	——	gunboat	——	Sunk, Adriatic	24- 5-15
	Beethoven	training ship	——	Struck a mine and foundered	17-12-14
	Temes	river monitor	433	Struck a mine and sank off Shabatz	23-10-14
661	Elektra	hospital ship	——	Torpedoed, Adriatic	18- 3-16

TURKISH WARSHIP LOSSES

260	Messudyeh	battleship	10,000	Sunk by British submarine B-11 in the Dardanelles	14-12-14
	Kheyr-Ed-Din	battleship	9,900	Torpedoed by British in the Sea of Marmora	9- 8-15
1375	Mejidieh	cruiser	3,330	Sunk by Russian mine in the Gulf of	
	Yadikar Nilet	destroyer	610	Sunk by a British submarine	- 5-15
1757	Barbarossa				
1757	316 Yar Hissar	destroyer	284	Sunk by British submarine in the Sea of Marmora	3-12-15
	Demir Hissar	torpedoboat	97	Stranded and interned at Chios	17- 4-15
1019	Dhair Hissar	torpedoboat	97	Driven ashore, Greece	17- 4-15
317	Burak Reis	gunboat	502	Scuttled to avoid capture	31-10-14
				Odessa.	3- 4-14
1376	Pelenk-I-Derih	gunboat	886	Sunk in the Sea of Marmora by British submarine	24- 5-15
	Marmaris	gunboat	492	Sunk by British in Tigris River	1- 6-15
1376, 1757	Berk-i-Satvet (type)	gunboat	725	By mine near Dardanelles	29- 4-15
317	Issa Reis (type)	gunboat	500	Scuttled	1-11-14
	Doruk Reis	gunboat	502	Officially reported by Petrograd as sunk in Black Sea	10-12-15
	Malatia	gunboat	210	Officially reported by Petrograd as sunk in Black Sea	10-12-15
	Nagara	transport	——	Sunk by British submarine in the Sea of Marmora	- 5-15
1376	——	three transports with troops	——	Sunk by Russian warships	
2142	Carmen	transport	4,424	Submarine, Marmora	24-10-15
316	Rechid Pasha	transport	8,000	Submarine, Marmora	-12-15
	Bezemialen	troop ship	——	Sunk, Black Sea	14-11-14
	Bachriachmar	troop ship	——	Sunk, Black Sea	14-11-14
	Midiat Pasha	troop ship	——	Sunk by submarine	6- 9-15

In addition to the above, other Turkish men-of-war may have been destroyed around the Dardanelles and in the Black Sea. Reports from England, Russia and Turkey in regard to these operations are so conflicting that it is impossible to accurately state what Turkish vessels have been destroyed, especially transports and supply ships.

NORTH SEA

"KING EDWARD VII" SUNK OFF SPURN HEAD.—Captain Arthur K. Lindley, of the British Naval Reserve, who arrived in New York January 24, is quoted as saying that the spot where the British battleship *King Edward VII* was sunk by a mine was in the North Sea off the east coast of England. He said that the battleship was passing Spurn Head, near the new naval base at Immingham, when she struck the mine. Five German submarines were sighted off the Irish coast at the beginning of December, Captain Lindley said, and before he left London, two weeks ago, four of them had been captured or sunk, according to the report at the Admiralty. The new torpedo-boat destroyers, which can make 45 knots, he said, were scouring the seas in all directions in search of *U* boats. This, he said, made it difficult for the submarines to operate successfully for any length of time.—*Army and Navy Journal*, 29/1. (See page 300 for further particulars regarding King Edward VII.)

"ARETHUSA" MINED.—The loss of the well-known light cruiser *Arethusa*, after a brief but glorious career, was revealed by an announcement from the Admiralty on February 14 as follows: "His Majesty's ship *Arethusa* (Commodore Reginald Y. Tyrwhitt, C. B.) has struck a mine off the East Coast. It is feared that she will become a total wreck. About 10 men have lost their lives." The *Arethusa*, type-ship of a new class of light armored cruisers for scouting and reconnaissance duties and for service as destroyer leaders, was authorized in the 1912-13 Navy Estimates, built in dry dock at Chatham, and floated out on October 25, 1913. She had not completed fitting out when war began, but to the general surprise she took a prominent part in the battle in the Heligoland Bight on August 28, 1914, although she had only been commissioned a day or two earlier as an emergency ship. She again flew the broad pennant of Commodore Tyrwhitt in the seaplane raid on the German fleet and base at Cuxhaven on Christmas Day, 1914, and in the battle off the Dogger Bank on January 24, 1915, and appears, so far as official information shows, to have been the only vessel of the navy which took part in these three main engagements in the North Sea.—*Army and Navy Gazette*, 19/2.

"NATAL" COURT-MARTIAL.—In the House of Commons on Wednesday afternoon, Commander Bellairs asked what steps the Board of Admiralty had taken to ascertain the cause of the internal explosion which destroyed the *Natal*. Dr. Macnamara replied that the court-martial required under Section 92 of the Naval Discipline Act will be held shortly.—*Army and Navy Gazette*, 15/1.

"E-17" LOST.—The Dutch Ministry of Marine announced on January 6 that on the same day the Dutch cruiser *Noord Brabant* encountered off the Texel, outside territorial waters, a British submarine, which made signals of distress. The entire crew of 33 men were taken on board the Dutch cruiser and brought to the Helder. The submarine sank. From press accounts it would appear that when off the North Hinder the vessel got out of her course, and, running aground on the Haaksgrond Bank, sprang a leak. According to the *Handelsblad*, the submarine was not sighted by the cruiser *Noord Brabant* until she had been 10 hours in trouble. Later information showed that the boat was *E-17*, and a telegram from the Hague on Saturday stated that the Dutch Government, in accordance with the Hague Convention of 1907, had decided to intern the crew.—*Army and Navy Gazette*, 15/1.

GERMAN RAIDER "GREIF" AND BRITISH CONVERTED CRUISER "ALCANTARA" BATTLE TO THE DEATH

LONDON, March 25.

The news was given out here to-day of a fight in the North Sea between the German raider *Greif* and the British armed merchant cruiser *Alcantara*, in which both vessels were sunk. Five German officers and 115 men out of a total of 300 were captured. The British lost 5 officers and 69 men. The *Greif* was sunk by gun fire, and the *Alcantara* by a torpedo.

The following official statement was issued to-day:

"An engagement occurred on February 29 in the North Sea between the armed raider *Greif*, disguised as a Norwegian merchant vessel, and the British armed merchant cruiser *Alcantara*, Captain T. E. Wardle. It resulted in the loss of both vessels, the German raider being sunk by gun fire and the *Alcantara* apparently by a torpedo.

"Five German officers and 115 men were picked up and taken prisoners out of the total complement, believed to have been over 300. The British losses amounted to five officers and 69 men.

"It should be noted that during the whole engagement the enemy fired over the Norwegian colors painted on the side of the ship.

"This news is now published as it is made clear by the receipt of a German wireless message that the enemy has learned that the *Greif*, a similar ship to the *Moewe*, had been destroyed before she succeeded in passing our line of patrols."

The *Greif* attempted to run the British blockade the day the German cruiser *Moewe* returned. Evidently it was expected the patrol squadron would be engaged in hunting the *Moewe*, but the cordon of auxiliaries left no loophole. Seeing herself in a tight hole, the *Greif* turned eastward, proceeding toward home in a leisurely manner so as not to attract too much attention when she sailed by the *Alcantara*.

The two ships lay almost side by side while the captain of the British steamer inquired by megaphone for particulars of the strange vessel which, according to the official report, had the Norwegian colors painted on her sides, but which flew no flag. The inquiries from the *Alcantara* were answered in perfect Norwegian, but the actions of the raider aroused the suspicions of the British auxiliary. She was lowering a boat to send a searching party aboard when the German opened fire.

The action is described as one of the hottest of the war, recalling duels between evenly matched frigates in the days before the time of ironclads. According to the British account, the German raider was put out of action by a few broadsides, and sank after 12 minutes. She was followed to the bottom a few minutes later by her victorious adversary, which evidently fell victim of a torpedo launched from the *Greif's* tube a moment before the raider disappeared beneath the waves. Other British warships soon appeared on the scene and rescued many members of the crews of the two fighters.

The naval authorities say the *Greif* was as well equipped for raiding as was the *Moewe*.

The *Alcantara* was a large liner belonging to the Royal Mail Steam Packet Company of Belfast. She had been in the service of the British Government for some time. Her gross tonnage was 15,300. She was 570 feet long and was built in Glasgow in 1913.

Three German steamships are listed under the name *Greif*. The largest, a vessel of 1165 tons gross, is 235 feet long, was built in 1912, and is owned in Bremen.—*N. Y. Times*, 26/3.

ANOTHER SUBMARINE STRANDED.—Following closely on the sinking of *E-17* on January 6, off the Texel, and the internment by the Dutch authorities of her crew, another British submarine has stranded in the same locality. On January 21 the Secretary of the Admiralty made the following an-

nouncement: "One of His Majesty's submarines has grounded off the Dutch coast. Part of her officers and crew were taken off by a British destroyer, and the remainder were rescued by a Dutch warship, and have been taken to Holland. There was no loss of life." Although little information is available concerning the grounding of this second submarine, it appears that she immediately signalled to the torpedo-boat which was convoying her to send a boat to the assistance of her crew. Unfortunately, according to the *Nieuwe Rotterdamsche Courant,* this boat could only take off 11 men, and the remainder of the crew were taken ashore by the Dutch cruiser *Noord Brabant.* The Dutch Government does not yet appear to have come to a decision on the question of interning the crew. It is probable, however, that the authorities will insist on interning the men, following the precedent established in regard to the crew of *E-17,* who were rescued by the same Dutch cruiser, and who were interned in accordance, it is said, with the Hague Convention.—*Army and Navy Gazette,* 29/1.

GERMAN MINELAYERS ACTIVE.—The sinking of the British passenger steamer *Maloja* by a mine on February 27, between Dover and Folkestone, and also the British steamer *Empress,* which attempted a rescue, leads to the belief that the Germans have managed to employ vessels flying flags of neutral countries in strewing mines about the English Channel and North Sea. The *Empress* hit a mine half a mile away from the *Maloja,* but had time to rescue all aboard. The *Maloja* was a passenger steamer of 12,500 tons and went down so quickly that some 155 lives were lost, which included 49 passengers. A third victim of a floating mine the same day was the Dutch mail boat *Mecklenburg.* Her passengers and crew were saved by two other Dutch steamers. A stricter watch on vessels flying neutral flags is demanded by British newspapers. It seems very certain that German submarines have been active in sowing mines, aside from those that may have been strewn by other means.—*Army and Navy Journal,* 4/3.

ZEPPELIN "L-19" LOST.—Most of the naval news of the week concerning home waters has been connected with Zeppelin activity. On February 3 the Admiralty issued the following statement: "A fishing trawler has reported to-day to the naval authorities that she had seen a German Zeppelin in the North Sea in a sinking condition." Skipper W. Martin, of the trawler *King Stephen,* reaching Grimsby that morning, reported that early on February 2, in the North Sea, he saw Zeppelin *L-19* with her gondolas and part of her envelope submerged. He saw from 17 to 20 members of the crew on the top of the envelope, and they asked to be taken off. In view of the fact that the small craft could not deal with so many enemies without grave risk, and the fact that the gasbag seemed in no immediate danger of sinking, the master, concluding that the Germans, if helpless, were safe for some considerable time, left to report the circumstances to the proper authorities. On February 4 the German Admiralty confirmed the loss of this airship, and admitted her to be *L-19,* the same vessel on which the Dutch had fired owing to her having violated the neutrality of Holland. Although two naval vessels were sent out from Grimsby, they were unable to find any trace of the Zeppelin, which must have sunk in the gale which sprang up after the *King Stephen* left her.—*Army and Navy Gazette,* 12/2.

"FRANZ FISCHER" SUNK BY ZEPPELIN.—The sinking of the *Franz Fischer,* a captured enemy vessel employed as a coasting collier, was reported in the press on February 4. The vessel left Hartlepool on January 31 on a voyage south. According to Charles Hillier, one of the three survivors of the crew, about 10.30 on the following night a Zeppelin appeared right over the vessel, then at anchor off the Kentish Knock, and dropped a highly explosive bomb, which struck them amidships. The steamer remained afloat only two minutes, the captain and 12 others being drowned. Next

morning the wrecked Zeppelin *L-19* was sighted in the North Sea by the skipper of the steam trawler *King Stephen.—Army and Navy Gazette,* 12/2.

MINE-SWEEPER SUNK.—On February 11 the German Admiralty issued the following notice: "Last night, during an advance of our torpedo-boats, our boats met on the Dogger Bank, some 120 miles east of the British coast, several British cruisers, which at once fled. Our boats pursued them, sank the new cruiser *Arabis,* and hit a second cruiser with a torpedo. Our torpedo-boats rescued the commander of the *Arabis,* two other officers, and 21 men. Our forces suffered no damage and no losses." With reference to this message the Secretary to the Admiralty states that the cruisers mentioned were four mine-sweeping vessels, three of which have returned safely. The sunken vessel is not included in the list of merchant vessels commissioned as warships and auxiliary craft appearing in the official "Navy List" for October. The only vessel of the name of *Arabis* in Lloyd's Register is a motor ship of 3697 tons, belonging to the Flower Motor Ship Company. This vessel is now in far distant waters. In connection with the German activity in the part of the North Sea referred to, the Bergen correspondent of the Copenhagen *Politiken* stated on February 14 that incoming Norwegian ships reported having met a number of powerful squadrons of British warships everywhere in the North Sea from the Dogger Bank to the vicinity of the Norwegian coast. In the Atlantic also many British warships had been sighted.—*Army and Navy Gazette,* 19/2.

DUTCH SHIP TORPEDOED.—The Dutch tank steamer *Artemis,* 3803 tons, was torpedoed on February 2 in strange circumstances, and the Naval Department at the Hague is making an official inquiry into the matter. The owners state:

The *Artemis* left Rotterdam on February 1, and was stopped at midnight by four light-colored German torpedo-boats four miles east by north of the Noordhinder. The commander of the torpedo-boats ordered the captain of the *Artemis* to steam full speed for one hour in a direction south by east and then drop anchor. He arrived at the appointed anchoring place, and the *Artemis* was again stopped by two dark-colored German torpedo-boats, which ordered her to Zeebrugge. The captain declared he did not know the waters there and asked that one of the German officers should pilot the *Artemis.* This request was not complied with, but the steamer was ordered to drop anchor, which was done. Then the captain was informed that he had not obeyed orders, that his vessel was to be torpedoed, and that they would be granted five minutes to leave the ship in boats. Before the boats were lowered the torpedo was fired, and the ship immediately listed heavily. The torpedo-boats disappeared after the shot was fired. The crew of the *Artemis* remained in boats during the night, and at daybreak boarded the vessel, which, at two in the afternoon, was able to go to Rotterdam under her own steam.—*Army and Navy Gazette,* 12/2.

DESTROYER "COQUETTE" AND TORPEDO-BOAT "NO. 11" MINED

LONDON, Friday.

The British official statement follows:

"The torpedo-boat destroyer *Coquette,* Lieutenant Vere Seymour, R. N. R., in command, and H. M. torpedo-boat *No. 11,* Lieutenant John A. T. Legh, R. N., have struck mines off the east coast and sunk. The casualties were:

"The *Coquette,* an officer and 21 men.

"The torpedo-boat, 3 officers and 20 men."

The normal complement of the *Coquette* was 60 men. Torpedo-boat *No. 11* ordinarily carried 35 men.

The *Coquette* was built in 1897. She was 210 feet long and 19½ feet beam. She displaced 355 tons. Her armament consisted of one 12-pound gun, five 6-pound guns and two torpedo-tubes.

Torpedo-boat *No. 11* was built in 1906. She was 172 feet long and displaced 253 tons. She was armed with two 3-inch guns and three torpedo-tubes.—*N. Y. Herald*, 11/3.

ENGAGEMENT BETWEEN DESTROYERS.—A minor engagement between British and German torpedo-boat destroyers, the first sea engagement that has taken place in some time, occurred off the Belgian coast on March 20. The British Admiralty in its report said that four British destroyers engaged three German destroyers and that two of the German boats were hit by shells from the British destroyers. Four British sailors were wounded, the Admiralty stated, and the Germans escaped into the naval base at Zeebrugge, Belgium, after a running fight. The German destroyers are believed to have emerged either from the German base at Zeebrugge, Belgium, or to have made a dash along the Dutch coast from Heligoland, hugging the shore line until they encountered the British patrol boats. The German official account states that the fight was between three German torpedoboats and five British destroyers. "The enemy broke off the engagement after he had received several direct hits and he steamed out of sight at full speed. We suffered only unimportant damage," says the German statement.—*Army and Navy Journal*, 25/3.

ATTACK UNDER DUTCH FLAG.—"Further details of the attack on a German submarine by a British auxiliary cruiser, flying the Dutch flag, are given from an authoritative source," says the Overseas News Agency. "The submarine signalled the steamer to send boats, in order that the steamer's papers might be examined. This was done after an interval. It is stated that the steamer was a freighter of 3000 tons, with nothing suspicious about her appearance. She flew the Dutch flag and bore the name *Melanie*.

"While waiting for the boats the submarine submerged. It approached within about 1000 meters of the steamship, which opened fire with two cannon of medium type and with machine guns. The submarine escaped only by submerging.

"The steamer then attempted twice to ram the submarine, flying the Dutch flag all the time.

"There is no Dutch steamer *Melanie*, but there is a British boat of this name of 3002 tons.

"In connection with these facts is recalled a report of the Havas News Agency that on January 28 the French mail boat *Plata* without being attacked, opened fire on a submarine and sank her. Rear Admiral Lacaze, French Minister of Marine, was quoted by the Paris press as saying that all French trading ships had been ordered to ram or fire at submarines, whether or not attacked by them."—*N. Y. Times*, 6/2.

OPERATIONS ON THE BELGIAN COAST.—*Admiral Bacon's Despatch.*—The following despatch has been received from Vice-Admiral Reginald H. S. Bacon, K. C. B., C. V. O., D. S. O., commanding the Dover Patrol, reporting the operations off the Belgian coast between August 22 and November 19, 1915.

In the summer and autumn of this year circumstances enabled offensive operations to be undertaken from the sea at certain points on the Belgian coast. It is unnecessary to enter into the reasons for the various operations or the exact objectives attacked, since these are well known to their Lordships.

In all cases great care has been taken to confine the fire of the guns to objectives of military or naval importance, so as to inflict the minimum of loss of life and distress on the civil population, the larger number of whom are our Allies. In order to carry this principle into effect it has at

times been necessary to modify and even postpone projected attacks. The results, therefore, have been effecticve rather than sensational.

On the evening of August 22 I sailed with H. M. ships *Sir John Moore*, *Lord Clive*, *Prince Rupert*, and 76 other vessels and auxiliaries, and on the following morning attacked the harbor and defences of Zeebrugge. The results were markedly successful; all the objectives selected were damaged or destroyed. It was satisfactory that extreme accuracy was obtained with the gun fire at the long ranges necessary for the best attack of such defences. This accuracy fully justifies the novel methods used and the careful training in attention to details to which the vessels are subjected. A similar organization was employed in subsequent attacks.

On the 6th of September I attacked Ostende with five monitors, includin *General Craufurd* and *M-25*, and damage was done to submarine workshops and harbor works. The enemy returned our fire with heavy guns of caliber probably larger than our own, and with considerable accuracy. Again the shooting on the part of our vessels was remarkably good, and the assistance rendered by the auxiliary craft most valuable.

On the same day Westende was subjected to attack by H. M. ships *Redoubtable*, *Bustard* and *Excellent*, under the direction of Captain V. B. Molteno, and with results that reflected credit on all concerned.

On the 19th of September, with several of the vessels, including H. M. S. *Marshal Ney*, I carried out an attack against certain defences in the neighborhood of Middlekirke, Raversyde, and Westende, which resulted in damaging and silencing the batteries. Valuable cooperation was received from the French batteries in the vicinity of Nieuport.

On the evening of September 24 I despatched H. M. S. *Prince Eugene* and one other monitor and the requisite auxiliary craft to bombard the following morning the coast of Knocke, Heyst, Zeebrugge, and Blankenberghe (east of Ostende), while with the other vessels, including H. M. S. *Lord Clive*, on the same day, I carried out an attack on the fortified positions west of that place. Again, during these attacks, considerable damage was done.

On the 26th, 27th, and 30th of September I made further attacks on the various batteries and strong positions at Middlekirke and Westende.

On the evening of the 2nd of October I sailed with four monitors and again attacked with satisfactory results the batteries at Zeebrugge on the morning of the 3d. The whole coast during our passage was showing signs of considerable alarm and unrest as a result of the previous operations. Our advanced vessels were attacked by submarine boats, but without result.

On the 6th, 12th, 13th, and 18th of October and 16th-19th of November other batteries or positions of military value have been attacked by the vessels under my command.

Up to the present, therefore, concerted operations of considerable magnitude have been carried out on six occasions, and on eight other days attacks on a smaller scale on fortified positions have taken place. The accuracy of the enemy's fire has been good.

The damage inflicted on the enemy is known to include the sinking of one torpedo-boat, two submarines, and one large dredger, the total destruction of three military factories and damage to a fourth, extensive damage to the locks at Zeebrugge and the destruction of 13 guns of considerable caliber in addition to the destruction of two ammunition depots and several military storehouses, observation stations and signaling posts, damage to wharves, moles and other secondary places. Further, a considerable number of casualties are known to have been suffered by the enemy.

I regret that three vessels were lost during the operations: H. M. armed yacht *Sanda*, sunk by gun fire; H. M. drifter *Great Heart*, sunk by mine; H. M. mine-sweeper *Brighton Queen*, sunk by mine.

Our total casualties numbered 34 killed and 24 wounded, which, considering the dangers to which the vessels were exposed by gun fire, aircraft, submarine boats and mines on an enemy's coast, may be looked upon as

comparatively small in proportion to the number of officers and men taking part in the operations.

It is with regret that, among others, I have to report the death of Lieutenant-Commander H. T. Gartside-Tipping, R. N., of the armed yacht *Sanda,* who was the oldest naval officer afloat. In spite of his advanced age, he rejoined, and with undemonstrative patriotism served at sea as a lieutenant-commander.

I cannot speak too highly of the manner in which the officers and men under my command have carried out the duties allotted to them. The work has been varied, and to a great extent novel, but in all particulars it has been entered into with a zeal and enthusiasm which could not have been surpassed. The gunnery results have exceeded my expectations. Their Lordships will appreciate the difficulties attendant on the cruising in company by day and night under war conditions of a fleet of 80 vessels comprising several widely different classes, manned partly by trained naval ratings, but more largely by officers of the Naval Reserve, whose fleet training has necessarily been scant, and by men whose work in life has hitherto been that of deep sea fishermen. The protection of such a moving fleet by the destroyers in waters which are the natural home of the enemy's submarines has been admirable, and justifies the training and organization of the personnel of the flotilla. But more remarkable still, in my opinion, is the aptitude shown by the officers and crews of the drifters and trawlers, who in difficult waters, under conditions totally strange to them, have maintained their allotted stations without a single accident. Moreover, these men under fire have exhibited a coolness well worthy of the personnel of a service inured by discipline. The results show how deeply sea adaptability is ingrained in the seafaring race of these islands.

It is to the excellent work done by the destroyers and the drifters that I ascribe our immunity from loss by submarine attack. The mine-sweepers, have indefatigably carried out their dangerous duties. Throughout these operations attacks have been made on our vessels by the enemy's aircraft, but latterly the vigilance of our Dunkirk Aerodrome has considerably curtailed their activity. I wish specially to mention the cordial assistance always tendered to me by the Vice-Admiral Favereau, commanding the French second light cruiser squadron, whose patrol vessels have assisted to protect our ships from submarine dangers. In doing this, I regret to say, their patrols have lost three vessels and several gallant lives.—*United Service Gazette,* 20/1.

BALTIC

BRITISH MINE FIELD IN BALTIC.—The British Admiralty on January 28 notified Mr. Robert P. Skinner, American Consul General at London, of the location of a new mine field in the Baltic near the sound across the channel southwest of Drogden light vessel, just off Danish waters. Obstructions to navigation also have been placed between the Danish territorial waters and the German coast southeast of Rixhoft.—*Army and Navy Journal,* 5/2.

NEW WAR ZONE DECLARED BY GERMANS.—The following communication from the German Minister, it is reported, has been sent to the Swedish Government, relative to a new war zone: "I a short time shipping obstructions and mines will be laid out in different places outside of Swedish sea territory between 55 degrees 18 minutes and 55 degrees 25 minutes north latitude and 12 degrees 42 minutes and 13 degrees east longitude. As soon as further communications are received directions to shipping will be published."—*Army and Navy Journal,* 19/2.

STATEMENTS BY CHIEF OF GERMAN ADMIRALTY STAFF.—In an interview intended for American reading, Admiral von Holtzendorff, Chief of the German Admiralty Staff, has declared that, for four weeks no English submarine has had any successes in the Baltic. He says:

The increase of our navy during the war and that of England is about the same, but Germany's Navy will never be a danger to England. It is our merchant marine which England fears. The fact that to-day this fleet is undestroyed and ready at any moment peace is declared to resume its peaceful trading, is the one thing which causes the English anxiety. England does not fear the German Navy. She fears America and the growing American Navy.

The admiral denies that more than 50 German submarines have been lost. "Not one-half of that number, not nearly one-half," he says, and claims that in less than a year more than 1,300,000 tons of enemy merchant ships have been destroyed by German submarines.

To a question: "There are many reports that a big naval battle may be expected. What can your Excellency say about that?" the admiral answered: "Only that the decision does not rest with us. We are always prepared."—*London Times*, 1/2.

PATROL BOAT "ANDER" LOST.—The German patrol boat *Ander* foundered on Saturday night or early on Monday morning last off Kongshöj on Aeroe Island, in the Little Belt, about a hundred yards from the land. Wreckage and bodies were washed ashore, and apparently all the crew perished. The boat was attached to a patrol flotilla stationed in the waters south of Langeland. On Tuesday she was reported from Copenhagen to be completely broken up.—*Army and Navy Gazette*, 22/1.

ADRIATIC

THE COMMAND OF THE ADRIATIC.—The Austrian Navy has, within the last few months especially, enjoyed too great a freedom of action, keeping open her communications between her bases of Pola, Cattaro, and Fiume, while seriously interfering with the Allied transports with Montenegro and Albania. To this fact is due the collapse of the Montenegrin resistance, with its far-reaching consequences, at least so far as Italian ambitions are concerned. An experienced French journalist, now with the Italian forces in Albania and in a position to be well informed, recently made in the *Petit Parisien* the following noteworthy remarks: "The fate of Montenegro and Albania and the success of land operations on this side depend primarily on the effective command of the Adriatic, which cannot be said at present to be in the hands of the Allies." This truth cannot be repeated enough. Ammunition and food make the difference between successful resistance or surrender, and that is entirely the work of the navy. Things would have turned otherwise had not the Austrians been masters of the coast from Cattaro to San Giovanni di Medua. Strange to say, "dans cette guerre de montagne, c'est à la marine qu'est reservé le premier rôle." Events are fast leading, he considers, to a general sea action in the vicinity of Cattaro, but to render it decisive more unity and energy in that direction, a closer watch by scouts and flotillas, and the concentration of superior forces near at hand are needed on the part of the Allies. Already, on December 29, but for the superior speed of an Austrian scout and three destroyers, of 800 tons, a fight would have taken place that might have been a preliminary to an action between battle fleets.

There is no tendency here to exaggerate the importance of the capture by Austria of Mount Lovtchen, which commands the inner roadsteads of Cattaro. It is a purely Adriatic affair, without influence on the general course of events. At the same time it is a blow, perhaps a decisive one, to the legitimate ambition of the peninsula to dominate in the Adriatic, in the "mare amarissimo," and for this reason it is much to be deplored. As everybody knows, Cattaro is the finest natural harbor in the Adriatic, and perhaps in Southern waters, with the possible exception of Bizerta; that has, of course a greater strategic value. The Power that is master of Cattaro, with its four interior bays of Topla, Teodo, Risana, and Cattaro, will possess a safe base for its battle fleet and a splendid point d'appui for its

flotillas, easy to defend against either bombardment from the high sea or the ingress of hostile torpedo craft. The outer Bay of Traste, used as an auxiliary refuge for flotillas, is a further defensive asset. The importance of this naval center is all the greater as Italy's action is being paralyzed by the total absence of really good harbors on the eastern coasts of the peninsula. Italian journals, in commenting on Austrian efforts to render Mount Lovtchen impregnable, regret the lack of decision and the inertia which permitted the "irreparable" to take place, and even blame France for not having done more, forgetting that the Republic could hardly be expected to consent to the heavy sacrifices necessary for the capture of a stronghold such as Cattaro, which she could not have kept without offend-

THE TAKING OF LOVTCHEN

Mount Lovtchen, the stronghold of Montenegro, from which the Austrian port of Cattaro and the Montenegrin capital, Cettigne, can be commanded, has fallen to the Austrians.—*London Times*, 12/1.

ing the just Italian susceptibilities. Of course, so long as Mount Lovtchen was in Allied hands and could be armed with long-range guns and supplied with adequate aerial flotillas, Cattaro ought to have been made a death-trap to Austrian squadrons and flotillas, and its ultimate capture did not present anything like the difficulties which the brave Japanese encountered at Port Arthur. It is to be hoped this hard lesson will not be lost upon the Allies, and Paris experts are at one in urging a decisive effort with a view to putting an end to the activity of Austrian flotillas, and so minimizing the consequences of Austrian successes.—*The Naval and Military Record*, 2/2.

FALL OF LOVTCHEN.—In the Austrian *communiqué* of January 11, which announced the taking of Lovtchen from the Montenegrins after a three days' fierce battle, it was stated that the Austrian infantry fought "in splendid cooperation with the heavy artillery and warships." The fall of

Lovtchen, an imposing summit, some 5600 feet high, situated just inside the narrow tongue of the Dalmatian coast, deprives Montenegro of access to the sea. Mount Lovtchen has been called the key to the Adriatic. Its capture renders impregnable the Bay of Cattaro, which it overlooks, the latter being used by the Austrians as a naval base, which can only now be attacked from the land.—*Army and Navy Gazette*, 15/1.

AUSTRIAN TORPEDO-BOAT AND SEAPLANE SUNK.—On January 21 correspondents of various journals and news agencies at Venice recorded the sinking by a British submarine in the Adriatic of a disabled Austrian seaplane, and an Austrian torpedo-boat which came to its assistance. This is the first revelation of the presence of British submarines in the Adriatic, where hitherto French and Italian boats have been working with the Allied fleets. The incidents now reported occurred in the vicinity of Grado, in the Upper Adriatic, on the northern shore of the Gulf of Trieste. The two occupants of the seaplane had just been taken on board the submarine when a torepdo-boat arrived, which the submarine torpedoed and sank. The Austrian prisoners were subsequently transferred to an Italian battleship. It is stated that the vessel torpedoed in the Adriatic by the French submarine *Foucalt*, a fortnight or more ago, was the light cruiser *Helgoland*. —*Army and Navy Gazette*, 29/1.

DESTROYER "RENAUDIN" SUNK.—The French Ministry of Marine on March 16 announced that the squadron destroyer *Renaudin* was sunk in the Adriatic by an enemy submarine on the morning of March 18. Three officers, among whom were the commandant and second officer, and 44 seamen were lost. Two officers and 34 seamen were rescued by a French torpedo-boat which accompanied the *Renaudin*. The *Renaudin* was built in 1913 and measured 756 tons. She was 256 feet in length and was a 30-knot boat, but in her trials had developed 32 knots.—*Army and Navy Journal*, 25/3.

HOSPITAL SHIP "MARECHIARO" SUNK.—The sinking of the Italian hospital ship *Marechiaro* near San Giovanni di Medua, Albania, is reported in a despatch from Rome, February 28. The vessel is said to have struck an Austrian mine. It is reported there were numerous victims. The Italian steamship *Marechiaro*, 412 tons gross and 175 feet long, was built at Ancona in 1912 and was owned at Naples.—*Army and Navy Journal*, 4/3.

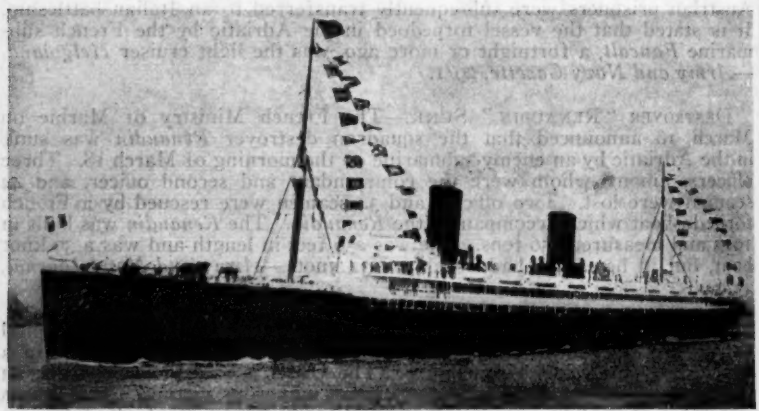
HOSPITAL SHIP "ELEKTRA" SUNK.—The Austro-Hungarian hospital ship *Elektra* was torpedoed on March 18, 1916, in the Adriatic Sea by an Entente Allies submarine, according to the Overseas News Agency. One sailor was drowned and two Red Cross nurses were badly wounded. The statement of the news agency also says that the *Elektra* was provided with the prescribed visible marks.—*Army and Navy Journal*, 25/3.

MEDITERRANEAN

"AMIRAL CHARNIER" SUNK.—The French Ministry of Marine announced on Sunday that uneasiness was felt regarding the fate of the cruiser *Amiral Charnier*, which had been cruising off the Syrian coast. Nothing had been heard of her since the 8th inst., the date on which, according to a German telegram, a German submarine sank a French warship. On Monday the loss of the cruiser was confirmed. Off the coast of Syria a raft has been found bearing 15 seamen, only one of whom was alive. This man said that the cruiser was torpedoed on February 8 at 7 a. m. The vessel sank in a few minutes without being able to launch her boats. The cruiser was of an old type, having been completed in 1895, and was of 4702 tons. She carried about 370 men. *Army and Navy Gazette*, 19/2.

AUXILIARY CRUISER "PROVENCE" SUNK.—The French converted cruiser *Provence* was sunk in the middle of the Mediterranean February 26, it was announced officially by the French Ministry of Marine. At Malta 296 survivors have been landed and 400 were landed at Milo. The Ministry estimates the total number of survivors at 870. She was sunk by a German submarine, and was a vessel of 18,400 tons, with a length of 627 feet, and was built in 1905. She was formerly a passenger steamer and ran from New York to France, and was one of the finest equipped steamers afloat. Her passenger capacity was: First cabin, 400; second cabin, 204; third cabin, 1000; crew, 350. The vessel had twin screws.—*Army and Navy Journal*, 4/3.

Further details as to the sinking of the French auxiliary cruiser *Provence II* by a German submarine on February 26 in the Mediterranean announce that there were nearly 4000 men on board when she was sunk. It was stated that on board the *Provence* were the staff of the Third Colonial infantry regiment, the Third Battalion, the second company of the First Battalion,



Shipping Illustrated 4/3.

THE EX-FRENCH TRANSATLANTIC MAIL LINER "LA PROVENCE," REPORTED SUNK IN THE MEDITERRANEAN WHILE SERVING AS AN ARMED TRANSPORT. "LA PROVENCE" WAS OF 13,753 TONS GROSS, 22½ KNOTS SPEED, BUILT IN 1905 FOR THE HAVRE-NEW YORK SERVICE.

the Second Machine Gun Company and one extra company, in all nearly 4000 men en route to Salonica. Two hundred and ninety-six survivors were taken to Malta and about 400 to Melos by French and British patrol vessels summoned by wireless. The loss of upward of 3130 lives is the greatest marine disaster known.—*Army and Navy Journay*, 11/3.

MINE-SWEEPER "PRIMULA" LOST.—The British Admiralty announced on March 3 that the mine-sweeper *Primula* was torpedoed and sunk on March 1 in the eastern Mediterranean while performing her usual duties. All the officers and crew, except three men, were saved and landed at Port Said.—*Army and Navy Journal.*

"U" BOAT BASES.—The Greek organ, *Neon Asty*, announced on January 18 that the Anglo-French fleet had made a search of various localities along the Greek coasts, with the object of discovering the bases of the Austrian and German submarines. This message explained the reason for various reports of what were called "landings of Allied troops" at points on the

Greek coasts. The object of the later "landings" is apparently merely the one declared in the terms of representations to the Greek Government from the Entente Powers, as published last month. The Allies demanded the right of policing Greek territorial waters in view of the presence of lurking enemy submarines. Among the places at which parties are reported to have landed, there are Corfu, Santi Quaranta, Zante island, Piræus (Port of Athens), Phaleron, near the Piræus, Sayada, and Corinth.—*Army and Navy Gazette*, 22/1.

JAPANESE FLEET REPORTED IN MEDITERRANEAN.—German newspapers print despatches from Italy stating that a Japanese fleet has arrived safely in the Mediterranean with a great number of aircraft. On January 3 announcement was made at Tokio by the *Jiji Shimpo* that a squadron of Japanese warships was to be despatched to the Suez Canal, presumably to protect Japanese shipping. The armored cruisers *Kasuga*, *Tokiwa* and *Chitose* were mentioned as having been assigned to this service.—*Army and Navy Journal*, 26/2.

THE GOEBEN'S ESCAPE.—*German Version of the Maneuver.*—A semi-official history of the adventures of the *Goeben* and *Breslau* has been published in Germany. Its author, Emil Ludwig, says he acquired the facts at first hand during a visit to Constantinople. He has apparently had access to the log book of the *Goeben*, and has received information regarding the flight of these vessels from the commander-in-chief, Vice-Admiral Souchon, whose photograph forms the frontispiece.

The author says that on August 6, 1914, at midday the admiral issued the following order to the three ships under his command at Messina:

News about the enemy is uncertain. I presume his strength lies in the Adriatic and that he is watching both exits in the Messina Straits. Object: To break through to the east and reach the Dardanelles. Order of going: *Goeben* leaves at 5 o'clock, at 17 miles an hour; *Breslau* follows at a distance of five miles and closes it up at darkness. I want to create the impression that we are wanting to go to the Adriatic and in case I so succeed in creating that impression that we are wanting to go to the Adriatic, we shall veer round in the night and make for Cape Matapan, if possible, throwing off the enemy. The steamer *General* to leave at 7 o'clock in the evening to keep along the Sicilian coast and to try and reach Santorin. Should she be captured, to try and let me know by wireless. If she receives no further orders from me, to ask for them at Loreley (Constantinople station ship).

As the ships—flags flying and music playing—were reaching the open sea the following wireless message from the Kaiser reacher the admiral: "His Majesty expects the *Goeben* and the *Breslau* to succeed in breaking through."

Shortly after leaving the harbor an English cruiser of the *Weymouth* class, alleged to be the *Gloucester*, appeared on the horizon. The English cruiser was emitting signals in three groups. The word "Mumfu" frequently occurred, and it was clear that it referred to the *Goeben*. The wireless receivers finally deciphered the signal of the British cruiser as follows: "*Goben* making for the Adriatic."

The German wireless officer argued thus: "I can jam him. If I break my waves against his I can confuse, hold up, destroy his messages. Shall I jam his wireless?" he asked the admiral.

"Shall we fire?" asked the commander.

"No," was the answer to both questions. No one apart from the staff understood the admiral. This is how he argued, however. "This boat is evidently a patrol intending to wireless our movements to the main British fleet. He shall save us, not ruin us. He shall do his work. We shall neither fire at nor jam him. Let him wireless that the Germans are making for the Adriatic, whereas the Dardanelles is our object."

It was dark. The *Breslau* closed in. It was 10 o'clock in the evening. Then came the order from the bridge: "Right about; starboard; make for Cape Matapan."

The watching British cruiser saw the maneuver, but before it could wireless the news that the Germans were making for the East the following order flashed out from the admiral: "Jam the wireless; jam it like the devil."

For hours the Germans were travelling eastward without obstacle, while the patrol boat tried to make itself understood in vain. Where did the error of our enemy lie? In England the excuse was advanced that the Germans had acquired knowledge of the British secret wireless code and so deceived the latter into waiting. Is it worth while contradicting such stuff? The English should have waited before the Straits of Messina and nowhere else. But so confident were they that the *Goeben* and *Breslau* must try and break through to the Adriatic in order to reach an Austrian port that they thought it safe to wait in the Straits of Otranto, which are 40 sea miles wide. So positive were they on this point that the thought of our making for the Dardanelles never seemed to have occurred to them.

The writer admits that the wireless messages of the cruiser which he calls the *Gloucester* evidently reached the British fleet, but they reached it too late—the German ships were en route for Constantinople.—*London Times*, 14/2.

BLACK SEA

RUSSIAN TORPEDO-BOATS SINK 163 SAILING VESSELS.—The destruction by Russian torpedo-boats of 163 sailing vessels in a raid in the Black Sea on the Anatolian coast on January 17 is reported in an official statement issued at Petrograd. Seventy-three of the ships, it is said, were laden with provisions. —*Army and Navy Journal*, 29/1.

DESTROYER "LEIT PUSHTSCHEEN" SUNK.—The Russian torpedo-boat destroyer *Leit Pushtscheen* was sunk by a mine March 10, 1916, according to Sofia dispatches. Four officers and eleven sailors were rescued. Presumably she was sunk off the Bulgarian coast. She was built in 1903 and displaced 350 tons. She carried a crew of 67 men.—*Army and Navy Journal*, 25/3.

TURKISH SUBMARINE DESTROYED.—The destruction of a Turkish submarine, which it is possible may have been the ex-French boat *Turquoise*, captured by the Turks in November, is announced in an unofficial but well-authenticated statement from Petrograd. From prisoners captured on the sunken steamer *Carmen*, says this report, it was possible to obtain interesting information regarding the object of the despatch of two gunboats from Constantinople last December. The gunboats received orders to bring off a Turkish submarine, which had grounded near the shore. They were unable to carry out the order because, as is known, they were sunk by Russian torpedo-boats under command of Captain Prince Trubetzkoy. Acting on information given by the men of the *Carmen*, Russian torpedo-boats approached on January 10 the spot where the submarine was said to have grounded. They discovered the submarine near the mouth of the Melen, and destroyed it with gunfire. The same day the same torpedo-boats sank two Turkish sailing ships with cargoes of coal. Five men of the crews of these ships were made prisoners.—*Army and Navy Gazette*, 22/1.

RUSSIAN ACTIVITY.—There is sustained activity on the part of the Russian naval forces in the Black Sea. On Saturday last the Turkish *communiqué* admitted that the Russian fleet had on February 6 again bombarded the coaling port of Zunguldak. On Monday, a Russian *communiqué* contained the following later information:

On February 9 and 10 some vessels of our Black Sea fleet kept up a heavy bombardment of the Turkish positions near Vitzeh, north of the Lazistan chain of mountains, between Cape Loros and Cape Nironit. They successfully engaged the Turkish coast batteries, reducing part of them to silence. On February 11 our squadron, supporting an offensive movement by our troops, destroyed two stone bridges, one of which was a three-arched one, and also four wooden bridges.—*Army and Navy Gazette*, 19/2.

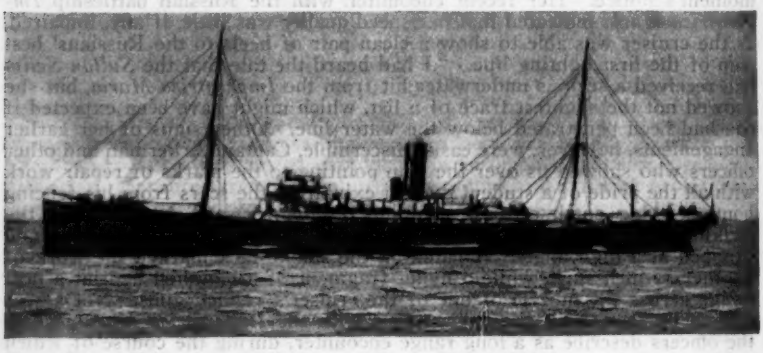
"SULTAN SELIM" ("GOEBEN") IN BATTLE TRIM.—The Turkish battle cruiser *Sultan Selim*, formerly the *Goeben*, of the German Navy, which according to quite a number of unreliable reports from various sources has frequently been sunk and battered to pieces during the past year, was still afloat and in fine trim on January 30, 1916. This fact is stated by a correspondent of the *Associated Press*, who went aboard the *Sultan Selim* at Constantinople. He states, among other things, that she shows the marks of many injuries received in her various encounters, notably three inflicted by Russian 12-inch sehlls, but only the scars remain. The correspondent was able to establish that she is not a cripple or "lame duck," but in perfect battle trim, with every gun intact, and ready to emerge for action at a moment's notice. Her recent encounter with the Russian battleship *Imperatriza Maria* indicated that her speed quality was little, if any, impaired, as the cruiser was able to show a clean pair of heels to the Russians' best ship of the first fighting line. "I had heard the tale that the *Sultan Selim* had received a serious underwater hit from the *Imperatriza Maria*, but she showed not the slightest trace of a list, which might have been expected if she had been penetrated below the water line. Other signs of her earlier engagements, however, were easily discernible, Captain Ackerman and other officers who showed us over the ship pointing to the marks of repair work with all the pride of a student duellist exhibiting the scars from his fencing bouts. A big patch of new planking on the forward deck marked the striking point of a 12-inch shell that came from a long range shot and dropped at a high angle. A patch on the smokestack marked the work of another 12-inch shell, while a flying fragment of a big shell had bit a neat gouge across the muzzle of one of the cruiser's 11-inch guns. Not a scar was to be seen from the engagement with the *Imperatriza Maria*, which the officers describe as a long range encounter, during the course of which neither vessel was injured. The officers of the *Sultan Selim* argue the presence of British officers with the Russian Black Sea fleet in the changed tactics, improved gunnery and greater aggressiveness of the Russian ships, and they expect, with the completion of the second and perhaps the third of the new Russian battleships, a display of greater activity against the mouth of the Bosporus."—*Army and Navy Journal*, 5/2.

ATLANTIC

EXPLOITS OF "MOEWE."—The mysterious German converted cruiser *Moewe*, which during her raids on the high seas captured or sunk 15 of the enemy's merchant ships in less than two months, returned safely to a German port, on March 5, according to an official statement made by the German Naval General Staff. The name of the port the *Moewe* reached is not named, but according to Amsterdam advices, it was Wilhelmshaven. The *Moewe*, according to the official announcement, also had aboard of her $250,000 in gold bars, taken from captured ships, and 199 prisoners taken from 15 allied vessels, all British with the exception of one French and one Belgian, aggregating a tonnage of nearly 60,000. Of these 15 vessels the majority were sunk, the German Admiralty says, while "a small part were sent as prizes to neutral ports." The *Moewe*, according to the statement, not only wrought havoc with enemy's merchant ships, but also engaged in sowing mines at several points on "the enemy coast." It was one of the *Moewe's* mines, the Admiralty avers, that caused the sinking on January 9

last of the British predreadnought *Edward VII,* from which every one of the 777 men aboard was saved by British rescue vessels. The capture of the British steamer *Saxon Prince,* of 3471 tons, and the French steamer *Maroni,* of 3109 tons, as given in the list announced by the German Admiralty, had not previously been reported and it is probable they fell afoul of the *Moewe* on her home run. The *Moewe* has certainly made a record as a successful blockade runner and commerce destroyer, and the Germans have cause to feel elated at her clever work. Doubts are expressed in some quarters that the *Moewe* has really arrived home, and the opinion is expressed that the announcement was made to fool the Allied warships, and that the *Moewe* is still at sea raiding. What we consider more likely is that most of the officers and men of the *Moewe* were transferred to one of the captured steamers, together with some guns, in order to provide another mysterious raider, which may be heard from soon.—*Army and Navy Journal,* 11/3.

A photo of the German raider now at large, which was taken by a British official on the passenger steamer *Appam* just before her capture by the



THIS PHOTOGRAPH OF THE "MOEWE" WAS MADE THROUGH A PORTHOLE BY ONE OF THE PASSENGERS ON THE APPAM

German, and the negative of which was secreted on the person of the official, was published broadcast in a number of American papers on February 6. It shows the raider to be a merchant steamer of about 6000 tons, built for carrying freight. She has a straight stern, one funnel and two masts, and her batteries forward and aft are hidden from view ordinarily, by collapsible steel plates, but her guns can be quickly uncovered and served. One of the British merchant captains who was a prisoner aboard says she was originally named *Ponga,* built in 1914, but that this name may have been changed to *Moewe.* The raider is now thought to have run the blockade from Kiel January 1 under false colors, with the Swedish flag painted on her abreast of No. 4 hatch and afterward obliterated with black paint. As a "neutral" vessel with Swedish colors the raider possibly was accorded the courtesy given to neutral shipping and it is thought possible she has been supplied with stores by vessels which bore the Norwegian flag on their sides and masts. One of these is said to have been the *Freischland* or the *Freisland.* From a passenger aboard the *Appam,* who understood German, it is said that the captain of the raider was well informed concerning the movements of British ships in the vicinity. It was also said that several other merchant ships have been fitted up by the Germans as raiders and may soon be heard from.—*Army and Navy Journal,* 12/2.

GERMAN SHIPS' DASH.—In addition to the three German vessels which are reported to have escaped from Central and South American ports, a fourth ship made an unsuccessful attempt to leave harbor. On Saturday it was reported from Rio de Janeiro that the German steamer *Asuncion*, detained in the harbor of Belem, having asked permission to shift her position nearer the shore for the purpose of watering, took advantage of a fog to make an attempt to put to sea. She was, however, detected by the cruiser *Republica* and the despatch boat *Teffe*, which fired blank shots as signals to her to stop. This summons being disregarded, they opened fire, and the *Asuncion* then stopped and returned to port. The captain declares that he had no idea of escaping. An official inquiry has been opened.—*Army and Navy Gazette*, 19/2.

EAST AFRICA

OFFICIAL ACCOUNT OF DESTRUCTION OF "KÖNIGSBERG."—The official account of the destruction of the German cruiser *Königsberg*, which was bottled up in the Rufigi River in German East Africa, was published on the 7th inst., in a supplement to the *London Gazette*. The *Königsberg*, a protected cruiser of 3348 tons and a speed of 23.5 knots, appeared early in the war in the Indian Ocean, destroyed the liner *City of Winchester*, and attacked the British gunboat *Pegasus* in Zanzibar harbor. Soon afterwards British cruisers compelled her to take refuge up the Rufigi River, where she hid herself in the jungle foliage from October to July. As no ships on the station could get at her, she was blocked in by sinking steamers in the channel. The story of how she was ultimately destroyed by monitors and aeroplanes is now graphically told by the Commander-in-Chief, Cape of Good Hope Station.

The following is the dispatch to the Admiralty:

"CHALLENGER," July 15.

Sir.—Be pleased to lay before their lordships the following report of the operations against the *Königsberg* on the 6th and 11th instant:

In accordance with orders issued by me, the various vessels concerned took up their appointed stations on July 5, in readiness for the operations on the following day.

At 4.15 a. m. on July 6, H. M. S. *Severn* and H. M. S. *Mersey* weighed anchor and proceeded across the bar into the Kikunja branch of the Rufigi River, which they entered about 5.20 a. m.

The *Severn* was anchored head and stern and fire was opened on the *Königsberg* by 6.30 a. m. The *Mersey* was similarly moored and opened fire shortly after. Both monitors were fired on with 3-pounders, pom-poms, and machine-guns when entering the river and on their way up, and they replied to the fire.

At 5.25 a. m. an aeroplane carrying six bombs left the aerodrome on Mafia Island. The bombs were dropped at the *Königsberg* with the intention of hampering any interference she might attempt with the monitors while they were getting into position. At 5.40 a. m. another aeroplane left the aerodrome for the purpose of spotting for the monitors. At 5.45 a. m. I transferred my flag to the *Weymouth*, and at 6.30 a. m. proceeded across the bar, with the whalers *Echo* and *Fly* sweeping, and the *Childers* sounding ahead, the *Pyramus* being in company.

The *Weymouth* grounded on the bar for a few minutes on the way across, but soon came off with the rising tide, and advanced as far as the entrance to the river, where she anchored. Fire from small guns was opened on her, and on the whalers, from the shore, but beyond one shell, which struck the *Fly*, no damage was sustained. A few rounds from the 6-inch guns put a stop to the firing, although it was impossible to locate the position of the guns owing to their being concealed amongst the trees and dense undergrowth. After anchoring, the *Weymouth* did what was possible

to assist the monitors by bombarding at long range a position at Pemba, where a spotting and observation station was supposed to be, and by keeping down the enemy's fire at the aeroplanes. This was done very effectively. At the same time the *Pioneer*, under the orders of the *Hyacinth*, engaged the defences at the Ssimba Uranga mouth, her fire being returned until the defences were silenced.

Returning to the operations of the monitors; fire was opened, as before stated, at 6.30 a. m., but as the *Königsberg* was out of sight it was very difficult to obtain satisfactory results, and the difficulties of the observers in the aeroplanes in marking the fall of the shots which fell amongst the trees were very great, and made systematic shooting most difficult.

There being only two aeroplanes available, considerable intervals elapsed between the departure of one and the arrival of its relief from the aerodrome 30 miles distant, and this resulted in a loss of shooting efficiency. At 12.35 one of the aeroplanes broke down, and at 3.50 the second one also. I signalled to Captain Fullerton to move further up the river, which he did, until about 12.50 the the tops of the *Königsberg's* masts were visible.

The *Königsberg* kept up a heavy fire on the monitors until about 12.30, when her fire slackened. At 2.40 p. m. she ceased firing, having for some time limited her fire to one gun. At 3.30 p. m. the monitors ceased fire, and retired out of the river, rejoining my flag off Koma Island at 6. p. m. On their way out they were again attacked by the small guns from the banks. I had returned over the bar in *Weymouth* at 12.30 p. m., and transferred to *Hyacinth* at 3 p. m.

The *Mersey* had four men killed and four wounded, two of whom have since died, and her foremost 6-inch gun, at which most of the casualties occurred, was put out of action. The *Severn* fortunately suffered no losses or damage. The various ships, whalers, etc., anchored for the night off the Delta, and proceeded to their various stations for coaling, etc., the following morning.

As it was necessary to make a fresh attack on the *Königsberg* to complete her destruction, further operations were carried out on July 11, by which date the aeroplanes were again ready for service, and the monitors had made good certain defects and completed with coal. The attack was carried out on the same lines as on the previous occasion, and the same mouth of the river was used.

The monitors crossed the bar at 11.45 a. m., followed up to the entrance by *Weymouth* and *Pyramus*, the latter proceeding three miles inside, and both searching the banks. *Hyacinth* and *Pioneer* bombarded the Ssimba Uranga entrance. On this occasion the monitors did not fire simultaneously; the *Mersey* remained under way and fired while *Severn* moored, and ceased fire when *Severn* commenced. The *Severn* was moored in a position 1000 yards closer to the enemy than on July 6, which made her fire much more effective.

The observers in the aeroplanes, by their excellent spotting, soon got the guns on the target, and hit after hit was rapidly signalled. At 12.50 it was reported that the *Königsberg* was on fire. As previously arranged with Captain Fullerton, as soon as they had got the situation well in hand, the monitors moved up the river, and completed the destruction of the *Königsberg* by 2.30 p. m., when I ordered them to withdraw.

The *Königsberg* is now a complete wreck, having suffered from shells, fire, and explosions, several of which latter were observed.

The only casualties sustained were three men slightly wounded in the *Mersey*. There were no casualties in *Severn*. By 8.00 p. m. all ships, except those detached on patrol, had returned.—*United Service Gazette*, 16/12.

OPERATIONS ON LAKE TANGANYIKA.—In order to combat the German squadron of four armed steamers which held control of Lake Tanganyika, in Central Africa, until two months ago, the British authorities sent out from England a number of steamers of superior armament, which were

taken to pieces, transported overland and launched on the lake, with the result that the Germans were soon chased into their port of Ujiji, on the eastern shore.—*Army and Navy Journal*, 26/2.

PACIFIC

PART PLAYED BY BRITISH FLEET AT TSINGTAU.—The following is the first authoritative account which has yet been published of the work done by the British fleet at Tsingtau. It fills in many gaps in our knowledge of the siege and is a document of first-class historical importance.

The blockade of Tsingtau was established on August 24, and the landing of the Japanese army was commenced on September 2, at Lungkow, to the westward of Chefoo, whence a fairly level plain exists to the terrain of the German territory. On September 10 the *Triumph*, then at Weihaiwei, received instructions by wireless to join up with the Japanese Navy forthwith, together with the *Usk* to take part in these operations. The ship at the time was at sea carrying out gunnery practices, and returned at once to Weihaiwei, coaled all night and proceeded on September 11 for Tsingtau, arriving off the Island of Chalientao on the morning of September 12. Off Chalientao was the *Suwo*, flagship of Vice-Admiral Kato, C. in C. of the second squadron, with the *Yakume*.

A conference of Allied captains was held on board the Japanese flagship and the system of patrols set out. On the arrival (September 13) of Admiral Tochinai in H. I. M. S. *Iwate* with auxiliaries, which included a large repair ship, the *Triumph* and *Usk* were ordered to act under his direct command.

During the blockade of Tsingtau the British ships conformed to the movements of the Japanese ships, taking part in all the operations and being based on Weihaiwei (except in the case of emergency) for coal and supplies. During this time in accordance with orders received from the C. in C., four maxims were prepared to fire vertically and two companies of men trained for defence against aerial attack.

The work for mounting one of the 6-pounders was also commenced and sweeping practices carried out.

On September 15 the *Triumph* and *Usk* left to convoy the G. O. C. and staff, together with the twenty-fourth regiment from Taku Bar to Laoshan Bay. On September 20 they called at Weihaiwei with transports, which embarked 259 mules, sailing for Laoshan Bay on the 21st, where they were met by a Japanese destroyer which led the British ships into the anchorage through the swept area. The British troops were landed on September 23 in the *Triumph's* and Japanese boats, and the following is a general description of the landing place in Laoshan Bay and arrangements made by the Japanese.

Landing in Laoshan Bay.—A broad flat shelving beach with a fair rise and fall of tide and deep water close to, sheltered from the north and west, provided a splendid landing place with plenty of inshore room for parking guns, exercising horses, storing ammunition and fodder, and laying sidings for a light railway. A very fair road (as roads go in China) leads inland to the mountain passes. The first pier to be built was a floating one by the navy, and this lasted well until heavy seas came in on October 16 and 17, but by this time it had served its purpose. Two pile piers were at this time under construction for landing the heavy howitzers, etc.

Flat bottomed sampans were mostly used for landing, each carrying 15 to 20 men or six horses, the latter being made to walk ashore when the sampans grounded. Large iron lighters were used for landing the gun carriages, gun stores and railway material, lighters being beached at high water and emptied at low. These same lighters carried the heavy guns, and howitzers, to the big pile piers, and a special vessel fitted with a powerful crane lifted them from the transports into the lighters, whilst a wooden gantry erected at the end of one of the pile piers was the means of landing

them, side tracks from the railway being laid up to the pier head. A vast number of Chinese were employed on all kinds of work, carrying stores and laying the railway, and appeared to take to the work with alacrity, as they did in all the operations on which they were engaged on inland.

An Inspiring Scene.—The Japanese themselves did the water work and the actual landing. The beach generally presented a most inspiring scene, British and Japanese flags crossed before the commandant's office, wireless station erected, long trains of ammunition and stores moving off, in one long continuous line, with an occasional howitzer battery interposed; railhead being pushed rapidly along, care being taken as much as possible to avoid crops; whilst the work of pile driving and pier building goes on incessantly, with continual landing of men, horses, and all kinds of material.

Total Number of Guns Landed.—The total number of guns believed to have been landed is made up as follows:

Fifty-eight siege guns, including six 28-centimeter (the same as used at Port Arthur, and nicknamed "Bottles" on account of their similarity), and six 10-inch guns, remainder heavy howitzers. Thirty-six field guns and 18 mountain guns. In addition four 4.7-inch and four 6-inch guns which are to be worked by a naval brigade of 500 men. At this time the Japanese believed that these guns would be in position and ready to open fire about the end of October.

After the landing of the troops had been effected, all ships continued to carry out the system of patrols laid down by the C. in C. During the whole of the operations mine-sweeping was continually carried out, and at about this period especially in and around Laoshan Harbor.

It was desired to clear an approach to this harbor as soon as possible, to enable an attack in force to be made on it from the sea, as, once secured, it would form a very convenient seaplane base, whilst as an advanced base for forwarding supplies to the army it presented many advantages on account of its comparative proximity to the firing line, compared with Laoshan Bay. Moreover it is also served with an excellent metal road.

Daily Reconnaissances by Seaplanes.—Daily reconnaissances, weather permitting, were made by the Japanese seaplanes. Working from the seaplane mother ship, they continued to bring valuable information throughout the siege. The mother ship was fitted with a couple of derricks for hoisting them in and out. During these reconnaissances they were continually fired at by the German guns, mostly with shrapnel, but were never hit. The Japanese airmen usually carried bombs for dropping on the enemy's positions. By September 27 the area swept was sufficient to warrant an attack being made on Laoshan Harbor from the sea, and accordingly all battleships and certain cruisers were ordered to return to Laoshan Bay. When assembled, a conference was held on board the flagship, and instructions given for the attack ordered for the next day, the general idea being that the second division (*Suwo, Iwami, Tango, Triumph*) should attack Iltis fort and adjoining works, whilst the *Tokiwa, Yakumo,* and destroyers would cover the landing of a naval force in Laoshan Harbor. These operations were timed to synchronize with the advance of the army, to the line of hills, of which Prince Heinrich is the southern extremity or the position of the left wing of the army, whilst the right was to rest on the shore of Kiaochou Bay, and the bombardment of the second division was intended to cover to some extent this advance.

Bombarding the Forts.—On September 28 both divisions proceeded to carry out their respective attacks. As the battleship squadron passed Laoshan Harbor it could be seen that the landing had been effected with but little opposition. At 8.45 a. m. the *Suwo* led the division up to the predetermined bombardment position, ships five cables apart, speed 12 knots, and opened fire at 14,000 yards, each ship opening fire in succession on reaching that range. Owing to the haze and mist both gunlaying and observation of fire were difficult. The *Chitose* had been previously posted off Taikungtao for the purpose of spotting, but during this run did not

prove of much assistance. The German forts did not reply, and it is probable that they were not ready. Whilst the squadron was steaming away to take up a position for another run, Iltis fort was observed firing at the troops advancing, and was thereby accurately located by our force.

At 9.35 a. m. the second run was commenced; by this time the light had improved considerably. Shortly after the *Suwo* had opened fire on this run, Fort A replied straddling her with a salvo. Each ship as she turned came under this fire, which was maintained by the fort throughout the run, and, though in many cases shots came close to the ships no hits were received.

The result of the bombardment could not be accurately determined owing to the great range and the fact that many of the works were hidden from the view of the squadron, but the operation was successful and covered the advance of the infantry to the predetermined line where they entrenched to await the bringing up of the siege guns.

It not being then known for certain what success attended the army advance, the fleet received orders for a further bombardment on the next day in the event of it being required. This time, however, it was intended to carry out a different plan, a slow steady fire being maintained from 7 a. m. till 5 p. m. by the battleships working in pairs (*Okinoshima* and *Mishima* being included to make six).

On September 29 the bombardment was cancelled, however, as news had been received during the night that the troops had effected their lodgement successfully the previous day, capturing an officer and 56 men. On October 1 Vice-Admiral Toohinai was ordered to take his squadron to cooperate in southern Korean waters, and accordingly relinquished direct command of the British ships; before leaving he presented a captured field gun and carriage to H. M. S. *Triumph* as a memento of British cooperation in the attack on Laoshan Harbor.

Seaplane Base at Laoshan.—By this date the minefield off Laoshan Harbor had been sufficiently cleared to permit of the establishment of a seaplane base on shore, and the work of landing a branch of the light railway and stores had commenced. The recovery of mines was undertaken by a flotilla of trawlers and torpedo-boats together with steam launches, and this was not performed without the loss of two trawlers and several lives, whilst the seaplane ship was badly damaged and had to be beached for temporary repairs before being sent to Sasebo. After these losses, trawlers were not much used as they drew too much water and before the end their use had been abandoned.

The Seaplane Corps and three *Henry Farman* 100-horse-power seaplanes were, in consequence of the damage done to the mother ship, landed at the base already established in Laoshan Harbor and this proved eminently satisfactory.

Landing of the Naval Brigade.—At this time, October 3, the Austrian cruiser *Kaiserin Elizabeth* and the German gunboats were annoying the Japanese right flank and supply columns continually by an enfilading fire from Tsanghou Deep in Kiaochou Bay.

To deal with this anticipated fire a naval brigade of 500 men with four 6-inch and four 4.7-inch guns had been sent and was established by October 4 on Kushan. This battery later on did good service, and on one occasion hit the *Kaiserin Elizabeth* three times, using indirect fire and driving her out of range to a position whence she could do but little damage to our troops.

A German aeroplane (*Taube*) came out during these days and attacked the repair ship (*Kwanto Maru*) dropping two bombs which, however, did not hit.

On October 4 a Japanese seaplane made a reconnaissance and reported that the *Cormoran* and two other gunboats had disappeared from view; it was concluded that the Germans had sunk them in the harbor as it was known that they had not escaped.

German Aeroplanes and Balloon.—At the commencement of the siege the Germans had one observation balloon and two monoplanes.

The balloon was constantly used by the Germans for directing their fire and was the only means, other than the aeroplanes, that the Germans had of seeing over the hills behind which our troops were entrenched and siege guns emplaced. It was constantly fired at by the Japanese, though never hit, and it was finally lost on October 7 by being blown away. In its course the balloon passed over the *Chitose* and *Triumph* and was fired at by maxims and rifles, but was at too great a height to be struck, and when last seen it was drifting to the northeast and was never heard of again. Of the aeroplanes, both were damanged by accident during the early part of the operations; but one was repaired and continued to do good service until the end, on one occasion fighting a duel with a Japanese aviator without success. At the fall of Tsingtau it was seen to fly away to Chinese neutral territory.

On the 6th a telegram was exchanged with reference to the number and names of prisoners, which was courteously answered by the Japanese. On this date the *Suwo* and *Triumph* carried out a long range bombardment, but owing to mines having been found in the vicinity of the position used by the ships when bombarding on September 28, and as this area had not yet been thoroughly swept, it was not considered advisable to go inside 15,000 meters of Iltis Hill, and at this range the fire was ineffective; consequently, after a few rounds, the bombardment was stopped. Mines during this period were daily recovered and one taken to the *Chitose* was the subject of examination the results of which will be forwarded by the Naval Attaché to the British Admiralty.

It is known that the Germans laid 296 mines; a plan was obtained after the capitulation.

Bombardment by the Fleet.—On October 12 orders were given to the fleet to bombard on the 13th, the plan being for the *Suwo* to bombard continuously Fort A, whilst the *Tango* and *Triumph* attacked Iltis Hill alternately.

These orders were subsequently postponed on account of the Emperor having intimated by wireless that he would graciously and humanely permit the non-combatants to leave the beleaguered town, as a consequence of which a flag of truce was sent in on the 13th and details arranged.

The fleet therefore carried out the usual patrol. On the 14th the bombardment was carried out in accordance with orders given on the 12th. The *Suwo's* 10-inch guns having greater elevation (24 degrees compared with the *Triumph's* 13 degrees) enabled her to fire at Fort A keeping out of range.

Fire was opened at 9 a. m. by the *Suwo* at A and the *Tango* at Iltis. Fort A replied, but fell short of the *Suwo*. At 9.40 a. m. she switched on to the *Tango*, shells falling all round her, and it was a marvel that she got away untouched. She ceased fire and steamed out of range. At 9.46 a. m. the *Triumph* came into action and for half an hour delivered an effective fire on Iltis Fort. At 10.30 a. m., just after the completion of the bombardment and when about to move away, she was struck by a heavy shell at a range of 14,570 yards just under the main crosstrees, doing considerable damage and splinters, passing through the main control roof, killed one able seaman and very seriously wounded an officer and one marine N. C. O. stationed in this position for range-finding duties.

The fire of the *Suwo*, though appearing effective, did not prevent Fort A from replying during the bombardment. The *Tango* and the *Triumph* had 10 hits signalled on the enemy's works by the *Akitsushima* which was marking. The fleets returned to Laoshan Bay after the bombardment and anchored.

German Squadron Reported.—It was reported from Tokio that a Japanese station in Formosa had observed a German squadron steaming in a northerly direction and accordingly the fleet proceeded to sea to meet it.

The weather at this time was very bad. The detailed instructions issued to the fleet are given below:

Orders for Allied Squadron.—First Division: 1. *Suwo*, 2. *Iwani*, 3. *Tango*, 4. *Triumph*.

"Maneuvering speed 10 knots. Full speed 15 knots. *Tango* to join near Tchalientau. During the day the squadron will patrol between R. 3 and M. 3, and during the night between R. 9 and L. 4 going east and west.

"*Mogami* will be day and night 20 miles south of B. 4 on right trunk line.

"*Okinoshimi* and *Mishima* leave Laoshan Bay 4 p. m. and patrol five miles east of Kitinean on a line parallel to AL and DL.

"*Saga* leaves at 2 p. m. and goes to position 30 miles from Tchalientau on Ross Island line.

"Lighthouses: Tchalientau will be lit as usual, but if necessary will be put out.

"When enemy is found patrol ships will inform by W/T at once and keep in contact with them.

"Full speed of *Okinoshimi* and *Mishima* is 12 knots. Rear-Admiral Okada with *Tone* and two flotillas (9th and 13th) will go to inner patrol line and attack enemy if necessary.

"*Kwanto, Kumano, Matsuye*, and sweeping flotilla will stay at Laoshan Bay under command of Kumane.

"One of sweeping flotillas will patrol entrance to Laoshan Bay and if enemy appears he is to be attacked.

"Aeroplane Corps will throw bombs on the enemy if case permits."

The Japanese undertook to repair the *Triumph's* mast, but in consequence of the report of the approaching squadron, the mast was only temporarily shored up and the squadron proceeded in the evening. The fleet anchored off Tchalientau on the 16th, patrolling again at night, and as no further news had been heard of the enemy's squadron, the fleet returned to Laoshan Bay on the morning of the 17th and a permanent repair of the *Triumph's* mast was undertaken.

The "Takachio" Sunk.—The night of the 17th was very dark and favorable for torpedo attacks, and this together with the fact that the enemy had no doubt observed the fleet at sea for the last two nights, decided him to send out S. 90; and she, falling in with the *Takachio* at 1 a. m. fired two torpedoes, sinking the *Takachio*, only one petty officer and two men being saved. The latter ship carried mines, and it is thought that these detonated and the great force of the explosion and the close proximity of the destroyer caused some of the latter's plates to open up, since she was afterwards found on the 20th instant beached on Tower Point 30 degrees S. W. Toni Bay, the crew escaping to the shore and eventually being interned at Nanking. From the time she escaped until her discovery on shore, extra patrols were put on all night, and special destroyers detailed to search the coast.

On the 20th *No. 7* British Hospital Ship arrived and was placed at the disposal of the commander-in-chief. The bad weather experienced from the 15th to the 17th did great damage to the landing facilities, washing away the pontoon pier and wrecking some 50 sampans and drowning some 25 Japanese soldiers. The pile piers stood the buffeting without suffering at all. At this time practically everything of importance had been landed, and the heavy rains rendered the roads impassable and washed large sections of the railway away, hindering the transport of the heavy howitzers and ammunition, the delay in consequence being estimated at from a week to 10 days.

By October 27 the Japanese had established a spotting and signalling station on a spur at Prince Heinrich Hill 900 feet high, situated N. 75 E. 6400 yards from Iltis. This station was used by both navy and army for directing the fire and was in connection by telephone with the shore gun positions and the shore wireless stations which latter signalled the results to

the ships. It consisted of a strong bomb-proof shelter well concealed from the enemy. The view of the enemy's positions obtainable was good. In addition to this aid to the fleet's shooting, special squared charts showing the enemy's defences were issued, and a general outline sketch showing the points of aim. This method of controlling the fire proved simple and effective. The defences of Tsingtau, in addition to the permanent works, mentioned in the military report on Kiaochou, 1906, with addenda, had been further strengthened, particularly against land attack by:

1. A continuous barbed wire entanglement and trench stretching right across the peninsula. This was supported by:

2. A chain of five redoubts; these redoubts were situated on the rising ground, between the barbed wire entanglements and the permanent works on Iltis, Bismarck, and Moltke hills.

3. Numerous batteries of a semi-permanent nature had, in addition, been erected in support of the redoubts, mostly in the rising grounds behind.

The defences' strength lay primarily in these redoubts, which were individually very strong; and, if these could be captured, the fortress must fall.

These redoubts, while differing in detail, were constructed on similar lines.

The Final Bombardment.—A half battalion of the 36th Sikhs arrived from Tientsin, and were landed on October 22. On the 26th the siege guns were being rapidly completed and communication trenches were being pushed forward by night and also artillery concrete positions, and, to assist in keeping down the enemy's artillery fire, the ships of the fleet bombarded certain of the enemy's positions during the day.

On the 29th instant the bombardment of the fleet was increased in intensity and was kept up practically all day. Ships were listed some five degrees, being thus enabled to keep out of range of Fort A, the only permanent work which could get at them in the line of approach adopted. The principal positions which could be reached by the guns of the fleet were Fort A and all works on or near Iltis Hill.

In addition, Forts A and C and the dockyard could be reached from behind the Haihsi Peninsula, but at this time the area had not been swept clear of mines.

Destruction of Floating Dock.—On November 3 it was reported that the *Kaiserin Elizabeth* had been blown up and had sunk off Chitosan, and this was later confirmed. Owing to the proximity of the attacking troops to the redoubt, it was considered no longer safe for the ships to fire at the low-lying works. Portions of the dockyard were burned and the large crane destroyed, the floating dock also careened and sank.

On November 4 the 28-centimeter guns opened on Fort A, whilst other positions were bombarded, particularly the redoubts, by the siege guns. During the 4th, 5th, and 6th the bombardment continued from the siege guns and also by the *Tango, Okinoshima,* and *Mishima,* from behind the Haihsi Peninsula. During the night of the 5th, Fort C was destroyed by the Germans without ever having fired a shot at the ships. The army sapped up to the crest of the first glacis.

On the night of the 4th the army sapped towards the 3d attack parallel and on the 5th dug the 3d attack parallel on the crest of the first glacis, this parallel being occupied on the night of November 6. During this night officers' patrols entered the 3d and 4th redoubts, No. 3 being captured, No. 4 blown up, and just before dawn No. 2 fell and white flags were flying everywhere by 7.00 a. m., November 7.

Reported Casualties.—Germans, 600 to 1000; Japanese, 300 killed, 900 wounded; British, 52; and Indian, 13.

During the night and early morning of the 6th and 7th a tremendous bombardment took place and was supported by shrapnel up to the last, a general assault was made on the redoubts, which fell in quick succession. The Germans did not wait for the bayonet but evacuated the redoubts,

losing heavily as they retreated without cover up the slopes of the hills behind.

At the time of writing the casualties on either side had not been officially announced, and as the fortress was not entered by the writers no certain details of damage done to the enemy's positions or their contents and construction can be given. But it was reported that some of the guns on Fort Iltis had been completely demolished. Certain guns and howitzers on Bismarck Hill had also been actually struck and then further disabled by the Germans themselves. The parapet of the redoubts had been blasted away by high explosive shell, both men, rifles and machine guns being completely destroyed.

Number of Rounds Fired.—The following is a record of the rounds fired by the squadron during the five days' bombardment prior to the fall of Tsingtau: 12-inch, 180; 10-inch, 408; 8-inch, 107; and 7.5-inch, 120.

Total number of hits signalled, 150.

Hits were on works being attacked and not necessarily on guns. Guns reported demolished: Five on Iltis Hill and one on slope. On four other occasions trenches were reported to be badly damaged.

List of Ships Which Took Part.—Battleships: *Suwo, Iwami, Tango, Okinoshima, Mishima, Triumph.* Armored cruisers: *Iwate,* Flag, *Tokiwa, Yakumo.* Light cruisers: *Chitose,* Flag, *Akashi, Akitsushima, Ghiveda, Takachio.* Flotilla cruisers: *Tone,* Flag, *Megami, Yedo.* Gunboats: *Ugi, Saga.* Late *Pebiedo,* Flag, late *Orel,* late *Poltawa,* late *Ad'Aperaxin,* late *Ad'Senyavia.* Destroyer depot ship: *Kumano Maru.* Repair ship: *Kwanto Maru.* Seaplane ship: Hospital ship, surveying ship, 8 mine-sweeping trawlers. Destroyers: *Usk* and 15 Japanese. Torpedo-boats: 12.—*North China Herald.*

MISCELLANEOUS

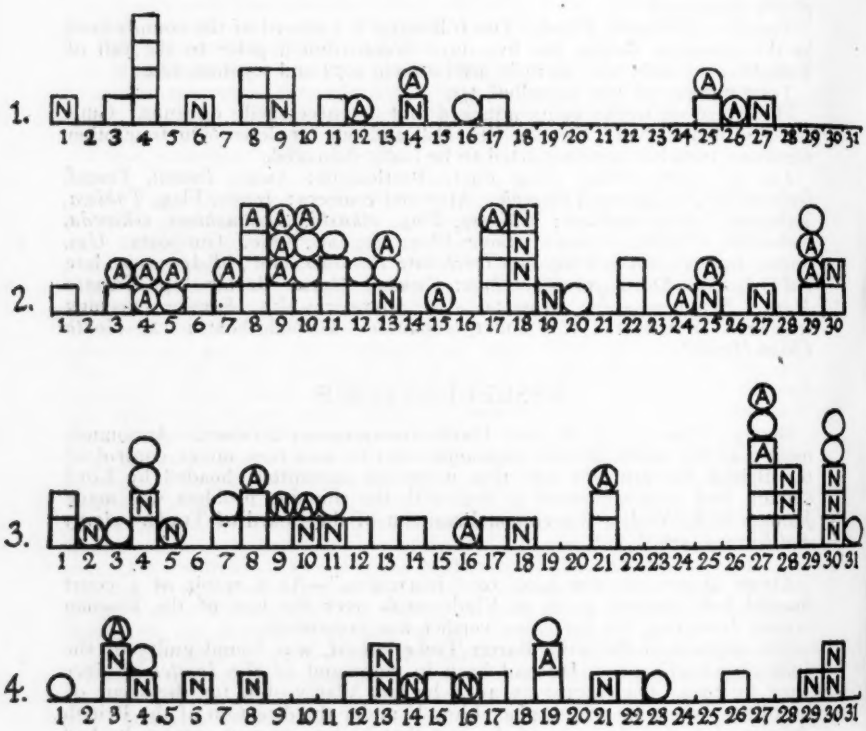
BRITISH MERCANTILE MARINE UNDER GOVERNMENT CONTROL.—Announcement that the whole British mercantile marine was now under control of the British Government and that a special committee, headed by Lord Curzon, had been appointed to deal with the shipping problem was made January 28 by Walter Runciman, President of the Board of Trade.—*Army and Navy Journal,* 5/2.

COURT MARTIALED FOR LOSS OF "JEMTCHUG."—As a result of a court martial held August 21-25 at Vladivostok over the loss of the Russian cruiser *Jemtchug,* the following verdict was presented:

The captain of the ship, Baron Tscherkassof, was found guilty of the following negligence: He had been in command of the *Jemtchug* since June 14, 1914. On August 25, 1914, he left Vladivostok for the scene of hostilities, where he was to place himself under the direction of the British Admiral Jerome. In spite of the fact that he was on war service, he had given the order that in case of smoke or lights on the horizon no general call should be given; he had not seen to it that the crew should sleep at regular hours; at night he had not increased the number on duty; he had not put torpedoes in readiness for an engagement; on entering harbor he had given orders to put the ship out of war trim; during the ship's stay in port he had allowed her to lie at anchor with open lights; with only an anchor watch, and with strangers at liberty to visit the ship and look her over freely.—*Norddeutsche Allgemeine Zeitung,* 1/10.

SAILORS IN SERBIA.—It was announced in the *Court Circular* on February 8 that Rear Admiral Troubridge had been received by the King. This was a welcome indication that the admiral had returned safely to England after his trying and arduous service in assisting the Serbian army. As the story of the doings of the naval and marine contingent under his orders is revealed, it is learnt how timely and useful was the aid given in defending

Belgrade, and even after it became necessary to retreat from the capital the seamen and marine gunners continued to render valuable aid with their heavy guns. It is not known at what date the mission under Rear Admiral Troubridge was sent out, but the admiral appears to have been at work in the country for the greater part of last year. In December it was stated by Dr. Macnamara that the contingent was sent to assist the Serbian army in the defence of the river frontier of Serbia, and it had played, said the Parliamentary secretary, a highly creditable part in the resistance offered to the overwhelming Austro-German attack. It afterwards accompanied



The above diagrams show ships attacked or sunk by mines and submarines in the months of October, November and December, 1915, and January, 1916. Circles denote ships sunk in the Mediterranean; squares, the ships sunk elsewhere. Blanks indicate British ships; the letter A, Allied ships; and N, neutral ships.—*Land and Water*, 10/2.

the Serbian army in its retreat. One of the most satisfactory features of the work of this contingent was the daring attacks of the improvised monitors and river gunboats under Commander C. L. Kerr. This little force was first heard of as having attacked the Austrian monitors on the Danube on the nights of April 21 and 22, 1915. Major Bertram Elliott, R. M. L. I., appears to have been in charge of another section which was responsible for the mining of the Serbian rivers during a period of several months—work which was often carried on under the fire of the enemy's patrols, and

always demanded skill and courage in its execution. Both these officers received the D. S. O. for their services, and some other officers and men were "mentioned" in the *Gazette* of January 21 last. It is much to be hoped that the Admiralty will be able to issue the despatch of Rear Admiral Troubridge covering the operations of his force and its retreat. This should certainly prove one of the most dramatic and thrilling narratives in which seamen have figured in the war. No doubt the British officers and men served under the orders of the Serbian military commander-in-chief, but our gallant ally probably has no objection to a report being published in this country.—*Army and Navy Gazette*, 19/2.

MERCHANT VESSELS LOST.—More than 2000 merchant vessels of nearly 4,000,000 tonnage have been taken from the seas by the European war, according to figures published by the Department of Commerce at Washington March 20. Germany, with 600 vessels sunk, captured or detained, heads the list of losers. Two hundred and twenty-five of the 500 British vessels lost were sunk by submarines. Great Britain's allies lost 80 and Turkey 124. The total of neutral losses is put at 736, but most of these were released after being reported captured. Ninety-two neutral vessels have been submarined, and 94 sunk by mines. Twenty-three have been damaged by submarines and mines.—*Army and Navy Journal*, 25/3.

A CRUISER'S LOG.—All naval men and students of sea warfare will be interested and instructed if they read "The Log of H. M. S. *Bristol*," which the Westminster Press have just added to their well-known "Log Series." This first naval record of the war to be written by someone inside the service sheds light, so far as the censor permits, upon the manner in which the flag is kept flying in distant parts of the world by those ships which have not the luck to go into action. From the time the *Bristol* was sent to Mexico in May, 1914, until she returned to pay off at Portsmouth in December last, she covered 58,361 miles, and put in an immense amount of strenuous work, steaming and coaling incessantly, but the only incidents in the nature of fighting which came her way were the skirmish with the *Karlsruhe* on August 6, 1914, and the sinking four months later of the transports accompanying von Spee's squadron. For the rest, the wearisome months passed by the *Bristol* searching for enemy cruisers in South American waters supply an effective answer to the query, "What is the navy doing?" The brush with the *Karlsruhe* is a suggestive commentary upon the policy which prevailed in the early days of the war of trying to catch the raiders with ships of inferior speed. It was during the afternoon of August 6 that the *Suffolk*, then flagship of Rear Admiral Cradock, reported that she had the *Karlsruhe* in sight, and the *Bristol* was worked up to full speed in the direction indicated. About 8 p. m., in the bright moonlight, she also sighted the German vessel, which had by then given the slip to the *Suffolk*. The *Bristol* opened fire with her 6-inch guns, but in the darkness it was impossible to see the result. The *Karlsruhe* replied vigorously, but her shells all came short. After an hour's firing she drew away out of range. One of the signals received by the *Bristol* during the skirmish was the following from the *Suffolk*, "Stick to it—I am coming," but Cradock, in a 12-year old cruiser only designed for 23 knots, was helpless in his attempt to get up with the two-year-old *Karlsruhe*, designed for 27 knots. How he must have longed for an *Invincible!* When at length the Admiralty, after Lord Fisher's return, sent out the two battle cruisers which were afterwards to knock out von Spee's squadron, the compiler of this log tells what happened after their arrival at the appointed rendezvous in the Atlantic:

"They coaled, and then the whole squadron was organized and a systematic search was commenced southward. The squadron, consisting of seven ships, spread out to extreme visual signalling distance, which reduced the use of wireless to a minimum, a valuable asset in our search . . . . The

search was continued to the Falkland Islands—a distance of 2400 miles—but no Germans were sighted, and we reached the Falkland Islands on December 7."

Here we have the spider's web theory in working on a small scale, and remembering how completely Admiral Sturdee swept the board by its means, what a difference it would have made had the two "spiders" been put on sooner. There are many other scraps of useful information in the "log," and the author, Mr. William Buchan, leading signalman, is to be complimented on his work.—*Army and Navy Gazette*, 4/3.

NAVAL PUBLICATIONS

BOOK REVIEWS

"The War in Europe." By Albert Bushnell Hart. 254 pages. $1.00 net. (Appleton and Company.)

Readers of current magazines will recall the homely, familiar style and air of easy authority with which Professor Hart is wont to consider historical and political questions. His book on the war in Europe has these qualities—or defects; but its impartiality, simplicity, accumulation of essential facts, and its author's wide range of knowledge make it an excellent handbook for ordinary readers, especially for those who have made no very close study of political or military affairs.

The first third of the book gives a general survey of the races, religions, industries, and historical development of the major and minor nations of Europe. It gives handy statistics, in terms of millions, of the wealth, trade, population, and military resources of the chief European powers.

Turning to the causes of the war, Professor Hart credits the Teutonic allies with a genuine fear of Pan-Slavism, though he scouts the possibility of any such union under Russian leadership. More definitely he points out that Hungary felt her integrity threatened by the rise of Serbia. "The Hungarian statesmen appealed to their Austrian brethren to come to their rescue . . . . the Austrian government probably communicated with Germany and received general assurances of support; and then issued the ultimatum in a form far more drastic than the German Imperial Government had expected." Germany was willing to avoid a general European war provided Austria was given a free hand with Serbia. This Russia felt that she could not afford to grant.

Looking to the future, the author wisely avoids definite predictions. One of the few he ventures—that Europe cannot now carry on war for three or for two years—has only a short time left in which to prove its truth. He is on safer ground, however, in discussing the probable terms of peace in the event of a decisive victory by either of the two contending forces; a third possibility being a condition of general exhaustion similar to that of Germany after the Thirty Years' War. The effect of that war, it is significant to note, was to reduce Germany from a population of thirty millions in 1618, to twelve millions in 1648—a blow which deprived her of early opportunity for development and colonial aggrandizement, and from which she only recovered after two hundred years. A. F. W.

"Wireless Telegraphy." By Dr. J. Zenneck. Tr. by A. E. Seelig, E. E. (McGraw-Hill.)

A valuable book. The earlier chapters discuss the properties of electric oscillators. These are followed by discussion and description of the methods of producing electric waves; their propogation over the earth's surface, and their detection.

There is a wealth of illustration and reference which will be of great value to the student. The phraseology throughout is clear, simple and concise. Many of the author's theoretical and experimental investigations are included.

The work may be best described in the author's own words:

"In choosing my subject matter, I was guided chiefly by the standpoint of the physicist. I have frequently discussed the arrangements or devices involving a new physical idea, even though knowing that they had either not been used to date or are no longer used in practice. To confine ourselves to what is of practical importance will only be proper when once it has been fixed what really is of 'practical importance.' . . . . Unquestionably, theoretical investigation, laboratory experiments, and experiences in practice have cleared much in recent years. Nevertheless, there still remain a number of problems which find no answer in the results obtained to date. If then my presentation of these problems falls short of the necessary clearness, the fault does not rest entirely with me." S. S. R.

"The Relation of International Law to the Law of England and of the United States of America." By Cyril M. Picciotto, B. A. Price $1.75 net. Postage 12 cents. (McBride, Nast & Co., New York City.)

This volume is mainly the Whewell Scholarship Dissertation presented by Mr. Cyril M. Picciotto in connection with this scholarship of the University of Cambridge, England, and is prefaced by an introduction by Dr. Oppenheim who is at present the Whewell Professor of International Law in the Cambridge University.

It is a fresh discussion of the subject and contains also an embodiment of a paper upon Orders in Council read by Dr. Oppenheim before the Cambridge Law Society. The question of the relations between International Law and Municipal Law is one discussed in a more or less perfunctory way by all writers upon International Law. Those who discuss it from the standpoint of English or American Municipal Law generally follow the doctrine quoted from the commentaries of Blackstone who says: "It is also the sovereign's prerogative to make treaties, leagues and alliances with foreign states and princes. For it is by the law of nations essential to the goodness of a league that it be made by the sovereign power; and then it is binding on the whole community, and in England the sovereign power *quod hoc* is vested in the King. Whatever contracts, therefore, he engages in no other power in the Kingdom can legally delay, resist, or annul."

Among the English authors who have not accepted unreservedly this dictum of Blackstone, are Maitland in his Constitutional History of

England and Sir William Anson in his work on the Constitution. Westlake says: "The English Courts must enforce rights given by International Law . . . . subject to the rules that the King cannot divest or modify private rights by treaty (with the possible exception of treaties equivalent to those of peace), and that the Courts cannot question Acts of State." On the occasion of the cession of Heligoland to Germany in 1890, the government was advised to embody in the treaty a clause making the cession conditional upon the assent of Parliament and the same course was followed in 1904 in the case of some cessions from England to France.

In matters other than treaties we have in the first place the classic words of Blackstone who says: "The Law of Nations (whenever any question arises which is properly the object of its jurisdiction), is here adopted to its full extent by the common law and is held to be a part of the law of the land, and those Acts of Parliament which have from time to time been made to enforce this universal law, or to facilitate the execution of its decisions, are not to be considered to be introductive of any new rule, but merely as declaratory of the old fundamental constitution of the Kingdom without which it must cease to be a part of the civilized world."

In direct opposition to this doctrine was the decision made in 1876 in the case of R. *vs.* Keyn by Chief Justice Cockburn in behalf of a majority of the court that an English court has not the power to give effect for the first time to a proposition of International Law which had never been previously embodied in an Act of Parliament nor in a judicial decision of a competent court.

In 1905, however, comes the decision of Lord Alverstone that "it is quite true that whatever has received the common consent of civilized nations must have received the assent of our country, and that to which we have assented along with other nations in general may properly be called International Law and as such will be acknowledged and applied by our municipal tribunals when legitimate occasion arises for these tribunals to decide questions to which doctrines of International Law may be relevant." This is we think the last and best words from an English court upon this subject so far as English courts and law are concerned.

So far as the United States is concerned the conclusions of the writer seem sound. They are:

1. A treaty made by the President and ratified with the consent of the Senate is part of the law of the land and on the same level as an Act of Congress; so that an earlier Act of Congress may be overruled by a later treaty and an earlier treaty by a later Act of Congress.

2. An Act of Congress overrules customary International Law.

3. Customary International Law, unless and until overruled by Act of Congress, is recognized and applied in the courts; and for this purpose the works of the text writers are regarded as affording evidence of what is International Law.

4. An Act of Congress is construed with the presumption that no violation of International Law has been intended. C. H. S.

"The Invasion of America." By J. W. Muller. (E. P. Dutton & Co., New York.)

In "The Invasion of America—A Fact Story Based on the Inexorable Mathematics of War," Mr. Muller has rendered an important service to the American people—if they will only heed his warning to "Prepare!" and his cool, judicial arraignment of that short-sighted policy which is responsible for our military and naval weaknesses. If this warning and this arraignment are not taken seriously by the reader of Mr. Muller's book, it will be the fault of the reader, not of the author. His task—to convince his readers of the urgent necessity for hitherto unprecedented preparation for a war of invasion—is not an enviable one. He has evidently realized that a technical argument, or an exposition of the facts, however sound and well thought out, is not enough for the unimaginative American public; that while it might reach a few, it would not appeal to the many. On the other hand, he has evidently realized the danger of having his book treated as an exercise of the imagination, for this, too, would not carry conviction. The result is that Mr. Muller combines cold facts with imagination, and hopes thereby to create interest as well as the driving power of reason.

Herein lies the difference between "The Invasion of America" and Mr. Cleveland Moffett's "Saving the Nation," for in Mr. Moffett's interesting narrative we find only a general basis of truth or fact, on which is built a structure of the imagination soaring far above and beyond the levels of a forecast based on facts. Mr. Muller's methods are very different. He must of necessity use his imagination to describe, with "human interest," an invasion which has not taken place; but every detail of his dramatic and vivid picture is positively "anchored" as if with a chain cable to facts stated in official reports. The reader is given the benefit of a great mass of authoritative knowledge which he could never hope to dig out for lack of time and opportunity, even if his interest were sufficient to impel him to such research. Each citation of fact is not only made "alive" as part of a thrilling narrative of quick and crowded action, but the skeptical or scientific reader is referred, by volume and page, to official records which challenge his doubts or his proof-seeking.

Moreover, Mr. Muller uses his imagination, so to speak, conservatively. He keeps well *within* every estimate. If actual experience has shown that a certain number of troops can be landed from transports in six hours after the word is given, Mr. Muller allows the "enemy" just double that time, or twelve hours. He magnifies the difficulties of the enemy at every turn, and minimizes the difficulties of our own forces. If the reader appreciates this conservatism, the effect is, of course, more impressive than it would otherwise be, but there is some danger that the careless reader may fail to grasp the full significance of such under-statement. The suggestion is therefore made that the most valuable part of the book, at least to the reviewer, is the constant succession of foot-notes referring to or quoting official documents.

In spite of the careful method of presentation indicated above, to which Mr. Muller sticks unswervingly from cover to cover, there will undoubtedly

be many readers of "The Invasion of America" who, upon finishing the story, will say, "After all, it is largely imaginative." In several instances known to the reviewer, remarks similar to this have been made, and in one case, upon inquiry, it developed that the critic had not read a single foot-note in the book. What is to be said in reply to the objection that the book is based partly upon the imagination?

For one thing, General Upton's "Military Policy of the United States" is not an imaginative work, and is therefore not read except by a very few. For another, "The Invasion of America" consists merely of a surface coating of imagination, and very reasonable imagination at that, on as hard and comprehensive a mass of fact as it seems possible to handle in one volume. But why scoff at imagination? Is it not essential to all achievement? And is it not the very quality which Americans, as a people, most need? If Americans had sufficient imagination to create, from their enormous resources, a fully adequate military and naval force for the defence of their country, there would be no necessity for the cry of "Preparedness." If as a nation we had "imagination," there would be no need of such a book as Mr. Muller's to stir, if possible, what little we have of that valuable quality of mind.

There are, however, valid objections to certain things in the book. It is not necessary for Mr. Muller to assume that four powers would form a great coalition to invade the United States, since the naval and military forces necessary to this attempt could be furnished by two powers, or even by one. Perhaps Mr. Muller reckons on four enemy nations in order to eliminate our navy at the start, and throw the emphasis upon our weakness in land defences, but he thereby leaves in the mind of the average reader an estimate of naval force required by the enemy which is much too large to conjure with, since it seems impossible for the United States to provide a "four-power standard" navy.

Then, too, Mr. Muller's preface seems inconsistent with the rest of the book. He seems to dampen enthusiasm at the start by saying "I hesitated a long time before I did this" (wrote the book). "I feared and still fear the dangers to which the possession of military power drives nations, and which are particularly great in the case of a republic. The obvious danger that a nation like ours if powerfully armed may be too easily impelled to war, is great enough. But still more grave is the danger of a deep and fatal change in our national spirit, our ideals and our attitudes toward the world outside of our own borders."

This in the preface. Follows then a book of 352 pages, a powerful argument for "preparedness" on land and sea against the disaster of invasion —the seizure of all the New England States, of New York City, and the nearby manufacturing cities of New Jersey, and the slow "bleeding to death" of the nation, stopped only by suing for peace before we can raise armies strong enough to drive out the invader. We may well inquire of Mr. Muller what he would suggest as a middle course between complete preparedness and disaster. Even if we grant some element of truth in the warning about militarism, it would seem, in the words of the old proverb, that "You cannot eat your cake and have it too." H. C. W.

"Empire and Armament." By Jennings C. Wise, late Professor of Political Science and International Law, Virginia Military Institute. Putnam, N. Y. 353 pp. $1.50 net.

The main part of Professor Wise's book, pages 3-324, is a historical survey of United States foreign and military policy, with the aim of showing that our foreign policy has been consistently aggressive, meddling, and "jingoist," whereas we have consistently failed to back up our foreign policy by adequate military and naval forces under centralized control.

The evidence of aggressive foreign policy is fairly convincing, though it should be borne in mind that expansion over undeveloped areas on this continent is another matter from expansion overseas. Furthermore, such demonstrations as those of sympathy with the Canadians during the "Patriot Rebellion" of 1837, and with the Hungarians in 1848, may be taken as illustrations of the irresponsible emotionalism of the American people, rather than as expressions of settled foreign policy. It may perhaps be said that the attitude of the American people during the last year indicates a decided change in national temper from that, for example, at the time of the Venezuela affair in 1895, and shows that they are not at present unduly bellicose or eager for foreign war.

The author's temperate attitude on questions of foreign policy gives added force to his strong argument for adequate national defence, which occupies the last hundred pages of the book. Throughout his style is admirably clear, and his book is a good popular presentation of the principles maintained in General Upton's classic study of our military policy.

A. F. W.

"Medico Military Aspects of the European War." By Surgeon A. M. Fauntleroy, U. S. Navy.

"Report on the Aftermath of Battle." By Edward D. Toland. (The Macmillan Company, publishers).

Two books have recently appeared having to do with the hospital organization and the method of dealing with wounds and handling the wounded of the war in Europe. The first is of things seen with the eyes of an expert, the latter is of those seen with the eyes of a novice but with very clear vision. Both books will be of interest to readers of the Naval Institute as they treat of a phase of war which may affect everyone who may sooner or later be destined to take part in the great game where men are merely pawns. Both observers agree as to the frightfulness of the wounds caused by the explosive effects of the large projectiles. Toland's descriptions are of the first days of the war when the onset was too sudden for any preparedness for taking care of the wounded, the only dependence was upon philantrophy of the public and here, as usual, the generosity and executive ability of the Americans were in evidence, not only in giving but in doing. One is most impressed in the "Aftermath of Battle" by the horrible conditions of wounds which have become septic on account of the men lying, in some instances, for days on the battle fields without care or attention. But some of the most

hopeless were saved by the skilful treatment of the surgeons. The most dreaded and fatal complication was tetanus, so common in these dirty wounds, because the bacillus of this disease is found in garden earth, or where the soil has been enriched with manure as is the case in the intensive cultivation of the land in France, these cases of lockjaw when once the spasms begin, defy medical and surgical remedies and more than 90 per cent die. The pen pictures of these scenes as described by Toland are very simply drawn, but they are as well defined as photographs.

Dr. Fauntleroy's report of the "Aspects of the War" was written a year later and should be read after Toland's for it shows how order came out of chaos, until as, at present, the different stages for the care of the sick and wounded are fully organized, including the refuge places for wounded. first aid stations, field hospitals, evacuating hospitals and base hospitals with the different ways and means of communicating between these stations, as litter bearers, ambulances, automobile ambulances, and well-equipped hospital trains. Apparently nothing has been left undone to repair the damage done by shot and shell, and the science and art of medicine and surgery have been very active in being able to quickly return men to the front or make useful citizens of human wrecks.

We have to thank typhoid prophylactic and anti-tetanic serum for doing away with decimating diseases, but Dr. Fauntleroy describes another which is very fatal and which, although previously known, has never been reckoned with to such an extent as in the present war, that is gas-bacillus infection causing gangrene. The underground methods of carrying on the present war have been favorable for the production of this infection and as Dr. Fauntleroy says "caused it to assume a prominent rôle in present day military surgery."

Dr. Fauntleroy's report is naturally of most interest to men of the medical and surgical profession, but his description of the military organization and equipment of the armies at war is instructive to all military men and the information coming direct from the battle fields and brought by such a keen observer is of great value. No one knows how much all this of which we read concerns us. A. M. D. McC.

ANNUAL FINANCIAL REPORT OF THE SECRETARY AND TREASURER OF THE U. S. NAVAL INSTITUTE

TO THE OFFICERS AND MEMBERS OF THE INSTITUTE:

Gentlemen.—I have the honor to submit the following financial report for the year ending December 31, 1915:

ITEMIZED CASH ACCOUNT

RECEIPTS FOR THE YEAR 1915

Items	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Totals
Dues	$1,871 95	$1,108 32	$333 05	$341 35	$3,654 67
Subscriptions	470 67	293 07	221 07	385 05	1,369 86
Extra Publications	12,636 25	8,221 93	3,321 47	8,167 25	32,346 90
PROCEEDINGS	17 65	38 25	28 81	83 33	168 04
Advertisements	358 50	73 30	364 59	49 87	846 26
Interest on money invested	647 50	650 08	692 50	768 50	2,758 58
Binding	16 20	19 90	17 00	11 50	64 60
Postage	99 19	114 96	93 24	130 48	437 87
Credits	10 29	10 21	7 10	4 40	32 00
Purchased books	39 00	94 66	89 77	106 17	329 60
Sundries	2 12	22	431 69	510 67	944 70
S. P. Essay check-Lippincott	.....	.....	.....	1,000 00	1,000 00
Life membership fees	30 00	30 00	30 00	30 00	120 00
Totals	$16,199 32	$10,654 90	$5,630 29	$11,588 57	$44,073 08

EXPENDITURES DURING THE YEAR 1915

Items	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Totals
Printing and binding PROCEEDINGS	$2,220 65	$1,324 14	$1,321 17	$2,739 70	$7,605 66
Printing and binding extra publications	5,439 66	5,354 83	2,283 35	4,186 27	17,264 11
Salaries	1,005 00	1,035 00	1,035 00	1,035 00	4,110 00
Contributors	495 00	659 50	371 00	922 00	2,447 50
Authors of books	3,646 40	1,121 40	212 00	1,082 80	6,062 60
Postage and telegrams	218 83	314 79	228 69	214 27	976 58
Expressage	28 89	7 11	7 41	57 67	101 08
Board meetings	84 60	71 40	.....	66 40	222 40
Office expense	40 50	150 59	2 15	3 02	196 26
Stationery	62 15	183 20	17 93	38 35	301 63
Purchase of books	301 67	949 00	109 80	664 92	2,025 39
Advertising	32 40	13 05	8 70	62 75	116 90
Prize Essay award	230 00	5 00	.....	.....	235 00
Honorable mention award	330 00	.....	.....	.....	330 00
Sundries	5 32	10 06	27 00	5 19	47 57
Checks deposited with proposals	.....	.....	425 00	589 00	1,014 00
Insurance on property	.....	.....	.....	80 00	80 00
Totals	$14,141 07	$11,199 07	$6,049 20	$11,747 34	$43,136 68

SUMMARY

ASSETS

Balance unexpended January 1, 1915	$13,642.27
Total receipts for the year 1915	44,073.08
	$57,715.35
Total disbursements for the year 1915	43,136.68
Balance on hand January 1, 1916	*$14,578.67
Bills receivable for back dues	1,260.20
" " " subscriptions	56.20
" " " advertisements	251.32
" " " extra publications	1,494.53
Certified checks outstanding	215.00
Value of back numbers of PROCEEDINGS	200.00
" " Institute property (office)	300.00
" " extra publications at cost of printing	13,161.78
	$31,517.70

LIABILITIES

Lord Baltimore Press	$5,608.85	
Royalties due authors of books	1,482.40	
Special Prize Essay award—Lippincott	1,000.00	
Adams Express Co.	.64	
Postal Telegraph Co.	.21	
Montague Mailing Machinery Co.	49.00	
George W. Jones	4.20	
Chesapeake & Potomac Telephone Co.	.75	
Wells Fargo Express Co.	8.07	
Western Union Telegraph Co.	1.68	
Spon & Chamberlain	2.30	
Houghton, Mifflin Co.	1.98	
Macmillan Co.	.83	
		8,160.91
		$23,356.79

*The balance ($14,578.67) unexpended January 1, 1916, is distributed as follows:

Seamen's Bank for Savings	$3,000.00
Rhode Island Hospital Trust Co.	3,432.14
Society for Savings, Hartford, Conn.	3,482.36
Farmer's National Bank	4,664.17
	$14,578.67

SECURITIES (BONDS) DECEMBER 31, 1915

Southern Railway 5 per cent Registered Gold	$6,000.00
Washington Railway & Electric Co., 4 per cent	2,000.00
Northern Pacific and Great Northern Co., 4 per cent	18,000.00
Potomac Electric Power Co., 5 per cent	2,000.00
Northern Pacific 3 per cent	12,000.00
Baltimore & Ohio (*$7,233.14 of these bonds is the Reserve Fund †)	9,000.00
New York City, Registered 4½ per cent	7,000.00
	$56,000.00

†RESERVE FUND.—This, by the Constitution, is composed of $3,050.00 originally credited to it, together with all life fees which have been or

may hereafter be received, and the principal of this fund shall be held in perpetuity to guarantee the future interest of the life members (*7,233.14).

B. C. ALLEN,
Lieut. Commander, U. S. Navy,
Secretary-Treasurer.

Audited and found correct.

H. H. CHRISTY, Commander, U. S. Navy.
RICHARD WAINWRIGHT JR., Lieut. Commander, U. S. Navy.
R. S. EDWARDS, Lieutenant, U. S. Navy.

NOTICE

The U. S. Naval Institute was established in 1873, having for its object the advancement of professional and scientific knowledge in the Navy. It now enters upon its forty-third year of existence, trusting as heretofore for its support to the officers and friends of the Navy. The members of the Board of Control cordially invite the co-operation and aid of their brother officers and others interested in the Navy, in furtherance of the aims of the Institute, by the contribution of papers and communications upon subjects of interest to the naval profession, as well as by personal support and influence.

On the subject of membership the Constitution reads as follows:

ARTICLE VII

Sec. 1. The Institute shall consist of regular, life, honorary, and associate members.

Sec. 2. Officers of the Navy, Marine Corps, and all civil officers attached to the Naval Service, shall be entitled to become regular or life members, without ballot, on payment of dues or fees to the Secretary and Treasurer. Members who resign from the Navy subsequent to joining the Institute will be regarded as belonging to the class described in this Section.

Sec. 3. The Prize Essayist of each year shall be a life member without payment of fee.

Sec. 4. Honorary members shall be selected from distinguished Naval and Military Officers, and from eminent men of learning in civil life. The Secretary of the Navy shall be, *ex officio*, an honorary member. Their number shall not exceed thirty (30). Nominations for honorary members must be favorably reported by the Board of Control, and a vote equal to one-half the number of regular and life members, given by proxy or presence, shall be cast, a majority electing.

Sec. 5. Associate members shall be elected from Officers of the Army, Revenue Cutter Service, foreign officers of the Naval and Military professions, and from persons in civil life who may be interested in the purposes of the Institute.

Sec. 6. Those entitled to become associate members may be elected life members, provided that the number not officially connected with the Navy and Marine Corps shall not at any time exceed one hundred (100).

Sec. 7. Associate members and life members, other than those entitled to regular membership, shall be elected as follows: "Nominations shall be made in writing to the Secretary and Treasurer, with the name of the member making them, and such nominations shall be submitted to the Board of Control, and, if their report be favorable, the Secretary and Treasurer shall make known the result at the next meeting of the Institute, and a vote shall then be taken, a majority of votes cast by members present electing."

Sec. 8. The annual dues for regular and associate members shall be two dollars, all of which shall be for a year's subscription to the UNITED STATES NAVAL INSTITUTE PROCEEDINGS, payable upon joining the Institute, and upon the first day of each succeeding January. The fee for life membership shall be thirty dollars, but if any regular or associate member has paid his dues for the year in which he wishes to be transferred to life membership, or has paid his dues for any future year or years, the amount so paid shall be deducted from the fee for life membership.

ARTICLE X

Sec. 2. One copy of the PROCEEDINGS, when published, shall be furnished to each regular and associate member (in return for dues paid), to each life member (in return for life membership fee paid), to honorary members, to each corresponding society of the Institute, and to such libraries and periodicals as may be determined upon by the Board of Control.

The PROCEEDINGS are published every two months, and anyone may subscribe for them. The annual subscription is $3.00; single copies, 50 cents. Annual dues for members and associate members, $2.00. Fee for life membership, $30.00.

All letters should be addressed U. S. Naval Institute, Annapolis, Md., and all checks, drafts, and money orders should be made payable to the same.

SPECIAL NOTICE

NAVAL INSTITUTE PRIZE ESSAY, 1917

A prize of two hundred dollars, with a gold medal, and a life-membership (unless the author is already a life member) in the Institute, is offered by the Naval Institute for the best essay presented on any subject pertaining to the naval profession.

On the opposite page are given suggested topics. Essays are not limited to these topics and no additional weight will be given an essay in awarding the prize because it is written on one of these suggested topics over one written on any subject pertaining to the naval profession.

The following rules will govern this competition:

1. The award for the prize will be made by the Board of Control, voting by ballot and without knowledge of the names of the competitors.

2. Each competitor to send his essay in a sealed envelope to the Secretary and Treasurer on or before January 1, 1917. The name of the writer shall not be given in this envelope, but instead thereof a motto. Accompanying the essay a separate sealed envelope will be sent to the Secretary and Treasurer, with the motto on the outside and writer's name and motto inside. This envelope is not to be opened until after the decision of the Board.

3. The successful essay to be published in the PROCEEDINGS of the Institute; and the essays of other competitors, receiving honorable mention, to be published also, at the discretion of the Board of Control; and no change shall be made in the text of any competitive essay, published in the PROCEEDINGS of the Institute, after it leaves the hands of the Board.

4. If, in the opinion of the Board of Control, the best essay presented is not of sufficient merit to be awarded the prize, it may receive "Honorable Mention" or such other distinction as the Board may decide.

5. In case one or more essays receive "Honorable Mention," the writers thereof will receive a minimum prize of seventy-five dollars and a life-membership (unless the author is already a life member) in the Institute, the actual amounts of the awards to be decided by the Board of Control in each case.

6. An essay not having received honorable mention may be published also, at the discretion of the Board of Control, but only with the consent of the author.

7. The essay is limited to fifty (50) printed pages in the PROCEEDINGS of the Institute.

8. It is requested that all essays be submitted typewritten and in duplicate, if practicable; essays submitted written in longhand and in single copy will, however, receive equal consideration.

9. In the event of the prize being awarded to the winner of a previous year, a gold clasp, suitably engraved, will be given in lieu of the gold medal.

By direction of the Board of Control.

B. C. ALLEN,
Lieut. Commander, U. S. N., Secretary and Treasurer

PRIZE ESSAY TOPICS

SUGGESTED AT THE INVITATION OF THE BOARD OF CONTROL

BY

THE PRESIDENT OF THE NAVAL INSTITUTE, THE SUPERINTENDENT OF THE NAVAL ACADEMY, THE PRESIDENT OF THE NAVAL WAR COLLEGE, AND THE COMMANDERS-IN-CHIEF OF THE ATLANTIC, PACIFIC AND ASIATIC FLEETS.

"The Mutual Relations of Gunnery and Tactics."

"The Place of the Naval Officer in International Affairs."

"The Evolution of Naval Doctrine from National Character."

"The Training of Enlisted Personnel to Produce Modern Man-o'-Warsmen: (a) Military Training; (b) Moral Training; (c) Education."

"The Organization, Employment and Training of Reserve Fleets and Flotillas."

"A Personnel Reserve for the Naval Service."

"Value of Speed as an Offensive Element in Battleship Strategy and Tactics, as Compared with Armor."

LIST OF PRIZE ESSAYS

1879

Naval Education. Prize Essay, 1879. By Lieut.-Com. A. D. Brown, U. S. N.

NAVAL EDUCATION. First Honorable Mention. By Lieut.-Com. C. F. Goodrich, U. S. N.

NAVAL EDUCATION. Second Honorable Mention. By Commander A. T. Mahan, U. S. N.

1880

"The Naval Policy of the United States." Prize Essay, 1880. By Lieutenant Charles Belknap, U. S. N.

1881

The Type of (I) Armored Vessel, (II) Cruiser best suited to the Present Needs of the United States. Prize Essay, 1881. By Lieutenant E. W. Very, U. S. N.

SECOND PRIZE ESSAY, 1881. By Lieutenant Seaton Schroeder, U. S. N.

1882

Our Merchant Marine: The Causes of its Decline and the Means to be taken for its Revival. "Nil clarius aquis." Prize Essay, 1882. By Lieutenant J. D. J. Kelley, U. S. N.

"MAIS IL FAUT CULTIVER NOTRE JARDIN." Honorable Mention. By Master C. G. Calkins, U. S. N.

"SPERO MELIORA." Honorable Mention. By Lieut.-Com. F. E. Chadwick, U. S. N.

"CAUSA LATET: VIS EST NOTISSIMA." Honorable Mention. By Lieutenant R. Wainwright, U. S. N.

1883

How may the Sphere of Usefulness of Naval Officers be extended in Time of Peace with Advantage to the Country and the Naval Service? "Pour encourager les Autres." Prize Essay, 1883. By Lieutenant Carlos G. Calkins, U. S. N.

"SEMPER PARATUS." First Honorable Mention. By Commander N. H. Farquhar, U. S. N.

"CULIBET IN ARTE SUA CREDENDUM EST." Second Honorable Mention. By Captain A. P. Cooke, U. S. N.

1884

The Reconstruction and Increase of the Navy. Prize Essay, 1884. By Ensign W. I. Chambers, U. S. N.

1885

Inducements for Retaining Trained Seamen in the Navy, and Best System of Rewards for Long and Faithful Service. Prize Essay, 1885. By Commander N. H. Farquhar, U. S. N.

1886

What Changes in Organization and Drill are Necessary to Sail and Fight Effectively Our Warships of Latest Type? "Scire quod nescias." Prize Essay, 1886. By Lieutenant Carlos G. Calkins, U. S. N.

THE RESULT OF ALL NAVAL ADMINISTRATION AND EFFORTS FINDS ITS EXPRESSION IN GOOD ORGANIZATION AND THOROUGH DRILL ON BOARD OF SUITABLE SHIPS. Honorable Mention. By Ensign W. L. Rodgers, U. S. N.

1887

The Naval Brigade: its Organization, Equipment and Tactics. "In hoc signo vinces." Prize Essay, 1887. By Lieutenant C. T. Hutchins.

1888

Torpedoes. Prize Essay, 1888. By Lieut.-Com. W. W. Reisinger, U. S. N.

1891

The Enlistment, Training and Organization of Crews for our Ships of War. Prize Essay, 1891. By Ensign A. P. Niblack, U. S. N.

DISPOSITION AND EMPLOYMENT OF THE FLEET: SHIP AND SQUADRON DRILL. Honorable Mention, 1891. By Lieutenant R. C. Smith, U. S. N.

1892

Torpedo-boats: their Organization and Conduct. Prize Essay, 1892. By Wm. Laird Clowes.

1894

The U. S. S. Vesuvius, with Special Reference to her Pneumatic Battery. Prize Essay, 1894. By Lieut.-Com. Seaton Schroeder, U. S. N.

NAVAL REFORM. Honorable Mention, 1894. By Passed Assistant Engineer F. M. Bennett, U. S. N.

1895

Tactical Problems in Naval Warfare. Prize Essay, 1895. By Lieut.-Com. Richard Wainwright, U. S. N.

A SUMMARY OF THE SITUATION AND OUTLOOK IN EUROPE. An Introduction to the Study of Coming War. Honorable Mention, 1895. By Richmond Pearson Hobson, Assistant Naval Constructor, U. S. N.

SUGGESTIONS FOR INCREASING THE EFFICIENCY OF OUR NEW SHIPS. Honorable Mention, 1895. By Naval Constructor Wm. J. Baxter, U. S. N.

THE BATTLE OF THE YALU. Honorable Mention, 1895. By Ensign Frank Marble, U. S. N.

1896

The Tactics of Ships in the Line of Battle. Prize Essay, 1896. By Lieutenant A. P. Niblack, U. S. N.

THE ORGANIZATION, TRAINING AND DISCIPLINE OF THE NAVY PERSONNEL AS VIEWED FROM THE SHIP. Honorable Mention, 1896. By Lieutenant Wm. F. Fullam, U. S. N.

NAVAL APPRENTICES, INDUCEMENTS, ENLISTING AND TRAINING. The Seaman Branch of the Navy. Honorable Mention, 1896. By Ensign Ryland D. Tisdale, U. S. N.

THE COMPOSITION OF THE FLEET. Honorable Mention, 1896. By Lieutenant John M. Ellicott, U. S. N.

1897

Torpedo-boat Policy. Prize Essay, 1897. By Lieutenant R. C. Smith, U. S. N.

A PROPOSED UNIFORM COURSE OF INSTRUCTION FOR THE NAVAL MILITIA. Honorable Mention, 1897. By H. G. Dohrman, Associate Member, U. S. N. I.

TORPEDOES IN EXERCISE AND BATTLE. Honorable Mention, 1897. By Lieutenant J. M. Ellicott, U. S. N.

1898

Esprit de Corps: A Tract for the Times. Prize Essay, 1898. By Captain Caspar Frederick Goodrich, U. S. N.

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1900

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1901

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1903

Gunnery in Our Navy. The Causes of its Inferiority and Their Remedies. Prize Essay, 1903. By Professor Philip R. Alger, U. S. N.

A NAVAL TRAINING POLICY AND SYSTEM. Honorable Mention, 1903. By Lieutenant James H. Reid, U. S. N.

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1904

The Fleet and Its Personnel. Prize Essay, 1904. By Lieutenant S. P. Fullinwider, U. S. N.

A PLEA FOR A HIGHER PHYSICAL, MORAL AND INTELLECTUAL STANDARD OF THE PERSONNEL FOR THE NAVY. Honorable Mention, 1904. By Medical Inspector Howard E. Ames, U. S. N.

1905

American Naval Policy. Prize Essay, 1905. By Commander Bradley A. Fiske, U. S. N.

THE DEPARTMENT OF THE NAVY. Honorable Mention, 1905. By Rear-Admiral Stephen B. Luce, U. S. N.

1906

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THE ELEMENTS OF FLEET TACTICS. First Honorable Mention, 1906. By Lieut.-Com. A. P. Niblack, U. S. N.

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THE PURCHASE SYSTEM OF THE NAVY. Third Honorable Mention, 1906. By Pay Inspector J. A. Mudd, U. S. N.

1907

Storekeeping at the Navy Yards. Prize Essay, 1907. By Pay Inspector John A. Mudd, U. S. N.

BATTLE REHEARSALS. A few thoughts on our next step in Fleet-Gunnery. First Honorable Mention, 1907. By Lieut.-Comdr. Yates Stirling, U. S. N.

THE NAVAL PROFESSION. Second Honorable Mention, 1907. By Commander Bradley A. Fiske, U. S. N.

1908

A Few Hints to the Study of Naval Tactics. Prize Essay, 1908. By Lieutenant W. S. Pye, U. S. N.

THE MONEY FOR THE NAVY. First Honorable Mention, 1908. By Pay Inspector John A. Mudd, U. S. N.

THE NATION'S DEFENCE—THE OFFENSIVE FLEET. How Shall We Prepare It for Battle? Second Honorable Mention, 1908. By Lieut.-Commander Yates Stirling, U. S. N.

1909

Some Ideas about Organization on Board Ship. Prize Essay, 1909. By Lieutenant Ernest J. King, U. S. N.

THE NAVY AND COAST DEFENCE. Honorable Mention, 1909. By Commodore W. H. Beehler, U. S. N.

THE REORGANIZATION OF THE NAVAL ESTABLISHMENT. Honorable Mention, 1909. By Pay Inspector J. A. Mudd, U. S. N.

A PLEA FOR PHYSICAL TRAINING IN THE NAVY. Honorable Mention, 1909. By Commander A. P. Niblack, U. S. N.

1910

The Merchant Marine and the Navy. Prize Essay, 1910. By Naval Constructor T. G. Roberts, U. S. N.

THE NAVAL STRATEGY OF THE RUSSO-JAPANESE WAR. Honorable Mention, 1910. By Lieutenant Lyman A. Cotton, U. S. N.

1911

Navy Yard Economy. Prize Essay, 1911. By Paymaster Charles Conard, U. S. N.

NAVAL POWER. Honorable Mention, 1911. By Captain Bradley A. Fiske, U. S. N.

WANTED—FIRST AID. Honorable Mention, 1911. By Commander C. C. Marsh, U. S. N.

1912

Naval Might. Prize Essay, 1912. By Lieutenant Ridgely Hunt, U. S. N. (retired).

INSPECTION DUTY AT THE NAVY YARDS. Honorable Mention, 1912. By Lieut.-Commander T. D. Parker, U. S. N.

1913

The Greatest Need of the Atlantic Fleet. Prize Essay, 1913. By Lieut.-Commander Harry E. Yarnell, U. S. N.

NAVY DEPARTMENT ORGANIZATION. A Study of Principles. First Honorable Mention, 1913. By Commander Yates Stirling, Jr., U. S. N.

TRAINED INITIATIVE AND UNITY OF ACTION. Second Honorable Mention, 1913. By Lieut.-Commander Dudley W. Knox, U. S. N.

1914

The Great Lesson from Nelson for To-Day. Prize Essay, 1914. By Lieutenant Commander Dudley W. Knox, U. S. Navy.

NAVAL POLICY AS IT RELATES TO THE SHORE ESTABLISHMENT AND THE MAINTENANCE OF THE FLEET. Honorable Mention, 1914. By Captain John Hood, U. S. Navy.

OLD PRINCIPLES AND MODERN APPLICATIONS. Honorable Mention, 1914. By Lieutenant Commander Dudley W. Knox, U. S. Navy.

MILITARY PREPAREDNESS. Honorable Mention, 1914. By Naval Constructor Richard D. Gatewood, U. S. Navy.

1915

The Rôle of Doctrine in Naval Warfare. Prize Essay, 1915. By Lieutenant Commander Dudley W. Knox, U. S. Navy.

AN AIR FLEET: OUR PRESSING NAVAL WANT. First Honorable Mention, 1915. By Lieutenant Commander Thomas Drayton Parker, U. S. Navy.

TACTICS. Second Honorable Mention, 1915. By Ensign H. H. Frost, U. S. Navy.

DEFENSE AGAINST SURPRISE TORPEDO ATTACK. Third Honorable Mention, 1915. By Ensign R. T. Merrill, 2d, U. S. Navy.

1916

The Moral Factor in War. Prize Essay, 1916. By Lieutenant (J. G.) H. H. Frost, U. S. Navy.